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MOTOR AGE

INTERNATIONAL HONORS ARE UNCLE SAM'S

George Robertson

Locomobile Finishing

Robertson Rounding a Turn

LOCOMOBILE WINS VANDERBILT CUP

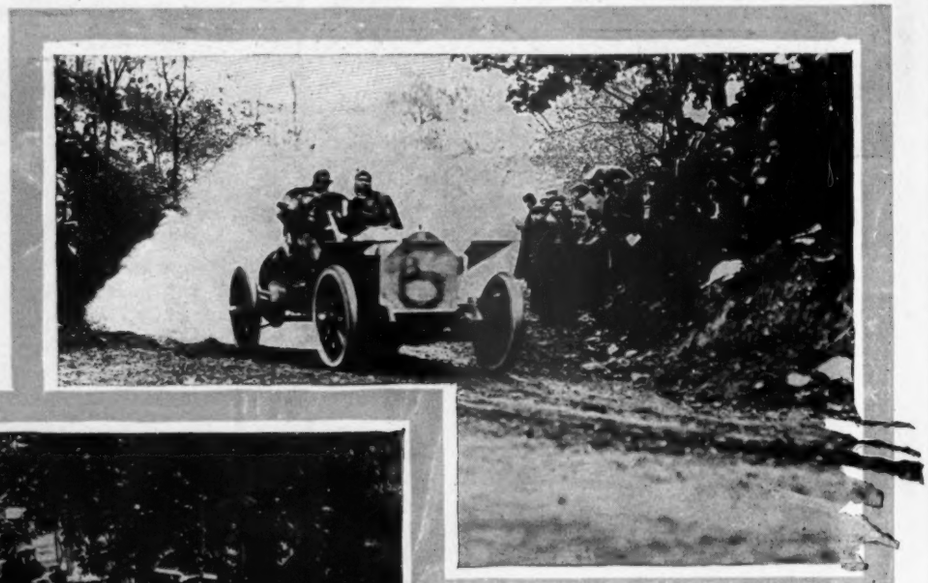
FINISH OF LEADERS

1—Locomobile, - Robertson
2—Isotta, - - - - Lytle
3—Locomobile, - - Florida
4—Mercedes, - - Luttgen

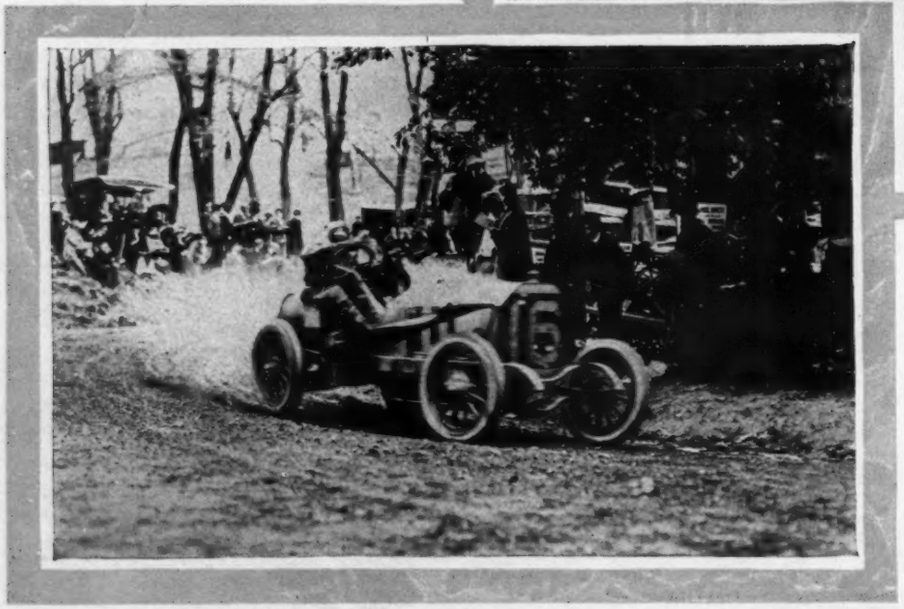
AMERICA has at last won the Vanderbilt cup race; George Robertson, driving an 84.1-horsepower Locomobile, being the victor, and defeating by the narrow margin of 1 minute 38⅕ seconds Herbert Lytle in the Isota car, which heretofore has proven the invincible European racing machine of American roads for the present season. Robertson's victory is truly an American one: The Locomobile he drove has been for years a representative American car; it was designed by A. L. Riker, a representative American designer; it was built at the Bridgeport plant, which is in every respect one of the pioneer, up-to-date American factories, and it was piloted by an American driver, whose performance has shown that Uncle Sam's sons are capable of negotiating Long Island road race at speeds in advance of those set by the foremost drivers of Europe in the three previous Vanderbilt road races.

The Robertson-Locomobile combination covered the 258.06 miles, composed of Long Island pike and 9 miles of the recently-constructed Long Island Motor Parkway cement roads in 4 hours 48⅕ seconds, or at an average speed of 64.38 miles per hour, thereby establishing a new record for American road racing by defeating the previous record of 64.25 miles made by Herbert Lytle in his Isotta car over the same course at the Sweepstakes 2 weeks ago. His closest competitor in the record-breaking run was this same Lytle with the same Isotta, and who, until Robertson had crossed the finishing line with his Locomobile, was a neck-to-neck contestant, disputing every mile of the eleven laps. Lytle's time was 4 hours 2 minutes 38⅖ seconds, making an average of 63.8 miles per hour. In spite of the narrow margin by which Robertson carried off the trophy, he had the race well in hand throughout and drove a much faster contest than did Lytle. Much of Robertson's time was lost in stops for tires, and taking on fuel; whereas Lytle had fewer stops for this cause and made the circuit without tire troubles of any nature whatsoever. Robertson's fastest lap—his third one—was made in 20:17, or at an average of 69.5 miles per hour, a performance which incidentally showed that his Locomobile had lost none of the speed it showed 2 years ago when Tracy put it over the course at a faster clip than any of the foreign racing creations.

With Robertson's victory, which was heralded throughout the entire parkway circuit by volleys of cheers, came the recognition of America, and of American cars, as premier factors in future road racing. His flashing across the line a winner gave to this country proprietorship for 1 year, at least, of a trophy that continental Europe has had possession of since its donation 4 years ago. While the field against which Robertson contended was not so classic as it has been on other occasions, the victory is none the less most complete, in that his average maintained speed of 64.38 miles per hour is much in excess of the records made by Heath, who made a mark of 52.2 miles per hour in his Panhard in 1904; Hemery, who raised this to 61.49 with his Darracq in 1905, and Wagner, who carried off the title in 1906 at an average speed of 61.43 miles per hour. Robertson's average speed shows particularly well when contrasted with other performances in American road races held at other points than Long Island. Lewis Strang, in the Isotta that Lytle drove, averaged 50.70 miles per hour at Savannah last March; with the same car in April he negotiated the tortuous Briarcliff course at an average of 46.15 miles per hour, and later at Lowell



LYTLE RUNS CONSISTENTLY

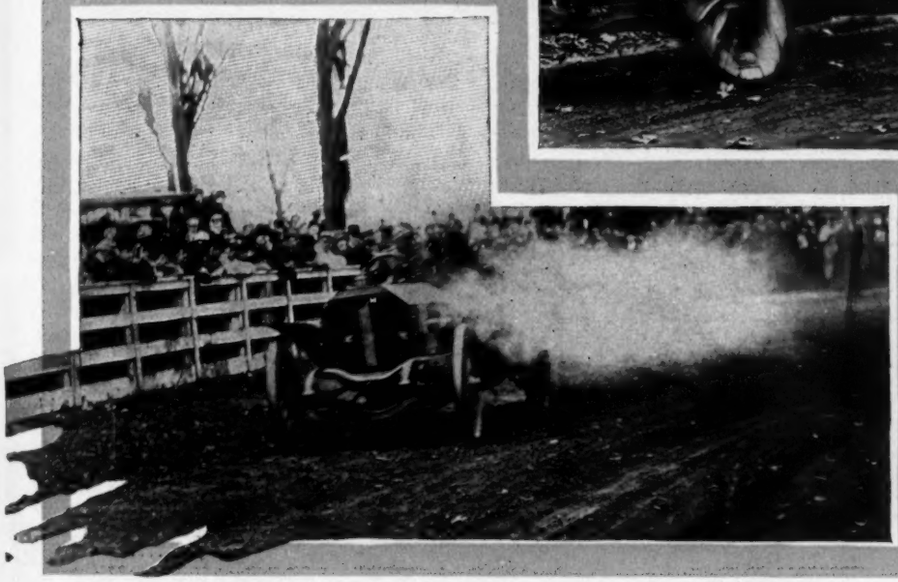


ROBERTSON NOT AFRAID OF THE BENDS

set a mark of 53.6 miles. Further credit goes to the Robertson performance in that his average speed of 69.49 miles per hour in the third lap was faster than Tracy's record lap 2 years ago, in which he set a pace of 67.66 miles per hour and made faster time than the best that Europe could produce.

From a standpoint of speed Robertson with his Locomobile, attained premier honors, and everybody, friend or opponent, gave due credit to him. But the gallant performance of Lytle's Isotta must not be overlooked, in view of the fact that the

Luttgen Running Fast on Back Stretch



Florida Leaves a Trail of Smoke

car is a lower-powered machine with a horsepower rating of 55.1. From start to finish Lytle handled the car with the utmost dexterity, and, while he failed to make laps in less than 21 minutes, he carried off the palm for consistency in running—an honor which Lytle has previously won in Vanderbilt cup contests. He was the first to complete the eleven laps; he started off 10 minutes in advance of Robertson and was never overtaken; in fact, as the figures show, he did not in the entire 258 miles lose more than a couple of miles at the most, being but that distance behind at the finish.

But the honors are not all to Robertson and Lytle. Far from it. There were other contestants, who, until the race was half over, were leading factors and who doubtless had they not encountered exasperating difficulties would have been close up at the finish. Willie Haupt in the Chadwick six led the field at the end of the sixth lap, only to be eliminated in the seventh because of magneto troubles. Jim Florida, driving No. 1 Locomobile, while never in the lead, was a dangerous factor throughout the contest, and was given unofficial third place. Stricker's Mercedes, at the end of the ninth lap, stood in order for third place by a lead of 17 minutes over Florida's Locomobile, but at this point it had cooling troubles due to the fan blades cutting into the radiator and so was out of the running. Luttgen, driving W. K. Vanderbilt, Jr.'s, Mercedes entry No. 5, was from the first a close contestant for third and fourth positions and was running when the race was called off, the unofficial time giving him fourth place.

One of the most regrettable features of the whole contest was the swarming of the crowds over the home stretch immediately Robertson had finished, and following which action Referee Vanderbilt immediately declared the race off. In spite of this, Florida brought his Locomobile to the grand stand, as did Luttgen his Mercedes, and though unofficial the time was sufficiently reliable to give the Locomobile third honors and Luttgen fourth.

When the race was called off, in addition to the four cars that actually completed the eleventh circuit, five others were running. Of these five, George Salzman in No. 12 Thomas was in within closest striking distance, being on his last lap. Denison, in his No. 2 Knox, had completed his ninth lap, and was negotiating his tenth, his small-powered car having performed at a 50-miles-an-hour rate through its nine laps and was running with the same regularity when the crowd took possession of the course. Bourque, in a smaller size shaft-driven Knox, was also running, having completed his eighth lap. His performance was somewhat slower than that of the Denison Knox, but equally consistent. Seymour, in the grand prix Thomas No. 8, had finished eight laps and would undoubtedly have had a much better standing had it not been for troubles. The other car to be in the running was Willie Haupt in his No. 4 Chadwick, which had registered eight laps. Nine cars out of seventeen, running at the completion of the race, was a most creditable performance, and of these nine seven were American-built machines, handled by American drivers.

Eight cars out of the seventeen that started fell by the wayside during the gruelling contest and were out of the race long before Robertson finished a winner. Of these eight to drop out two were eliminated in the second lap—Chevrolet's No. 15 Matheson with a cracked cylinder and Gill's No. 19 Thomas with gear troubles. Two others dropped out in the third lap

RECORD OF THE RACE, TIMES BY LAPS, AND AVERAGES OF THE CONTESTING CARS

No.	Car	H.P.	Driver and Mechanician	1	2	3	4	5	6	7	8	9	10	11	Average Fastest Lap	Average While Run
15	Locomobile	90	G. Robertson	20:54	43:07 22:13	63:24 20:17	89:14 25:50	111:37 22:23	132:07 20:30	152:43 20:36	173:19 20:36	195:41 22:22	216:36 20:55	240:48 1-5 24:12	20:17	64.3
6	Isotta	60	Herbert Lytle	21:52	43:26 21:34	65.16 21.50	87:19 22:03	110:47 23:28	132:47 22:05	154:52 21:56	176:48 21:52	198:36 21:52	220:46 22:10	242:36 2-5 21:50 2-5	21:33	64.0
1	Locomobile	90	James Florida	23:10	45:23 22:13	67:36 22:13	93:34 26:08	115:22 21:38	143:39 29:17	165:15 21:36	191:14 25:59	227:23 36:09	249:07 21:44	268:10* 21:03	21:40	56.6
5	Mercedes	90	W. C. Luttgen	23:32	49:16 25:44	72:10 22:54	94:34 22:24	116:50 22:16	139:15 22:25	166:42 27:27	188:49 22:07	216:14 27:25	243:30 27:16	270:35† 27:05	22:16	57.3
12	Thomas	115	G. Salzman	22:04	46:17 24:13	68:54 22:37	91:34 22:31	113:58 22:33	136:47 22:49	159:51 22:56	201:41 41:50	225:34 23:53	248:11 22:37	Running	22:04	56.7
3	Mercedes	120	E. Stricker	22:25	44:23 21:58	66:19 21:56	88:42 22:23	110:20 21:38	135:04 24:44	159:48 24:44	181:15 21:27	210:57 29:42	Caught fire, retired		21:27	60.0
2	Knox	50	A. Denison	24:33	56:39 32:06	81:42 25:03	107:19 25:37	141:36 34:17	167:20 25:44	195:18 27:58	225:56 30:38	253:09 27:13	Running		22:01	50.0
20	Knox	40	W. Bourque	27:15	52:06 24:51	77:32 25:26	103:06 25:24	135:41 32:35	163:47 28:06	195:00 31:13	222:20 27:20	Running			24:51	50.5
8	Thomas	60	J. Seymour	31:43	63:43 32:00	95:05 31:22	132:56 37:51	160:29 27:33	189:16 28:47	215:23 26:07	243:01 27:38	Running			27:38	46.0
4	Chadwick	60	Willie Haupt	21:53	43:22 21:29	64:49 21:27	86:10 21:21	107:46 21:36	131:54 24:08	188:00 56:06	244:15 56:15	Running			21:27	45.9
18	Mercedes	120	F. Keene	53:25	76:17 23:52	98:35 22:18	120:45 22:10	Caught fire and retired							22:10	46.0
7	Matheson	60	James Ryall	26:13	65:59 39:46	97:45 32:57	Caught fire at finish of fourth round Carbureter and magneto troubles								26:13	46.0
17	Renault	115	Lewis Strang	59:49	82:47 22:58	106:45 23:58	Broke clutch								22:58	40.0
11	Acme	90	C. Patschke	23:23	48:06 24:43	Broke camshaft gear									23:23	60.0
9	Hotchkiss	90	E. J. Kilpatrick	22:43	68:13 45:30	Clutch broke at Central Park									22:43	62.0
15	Matheson	90	L. Chevrolet	22:09	Cracked cylinder and retired										22:09	63.7
19	Thomas	115	H. Gill	26:45	Gear trouble—retired										26:45	53.0
10	Brasier	90	Leon Pouget	Broke steering gear on the way to the starting line—did not start											....	...
14	B. L. M.	90	T. M. Williams	Withdrawn											....	...

*Finished unofficially; time estimated, owing to accident near finish line; allowance 3 minutes
†Unofficial time, racing having been declared ended

—Patschke's No. 11 six-cylinder Acme, by breaking a timing gear, and Kilpatrick's No. 9 Hotchkiss, due to a broken clutch. Two more gave up the contest in the fourth lap—Strang with his Renault, due to a combination of magneto and clutch troubles, and Ryall's Matheson No. 7, because of carbureter and magneto troubles, and having reached the grand stand with the grease and gasoline in the mud apron on fire. Keene in No. 18 Mercedes went out in the fifth lap, due to fire, and Stricker in No. 3 Mercedes gave up in the tenth lap because of fire also. In recapitulating, it is of interest to know that all seventeen cars completed the first lap; two dropped out in the second lap; two more in the third; two more in the fourth; one in the fifth, and one in the tenth. In this respect the race was a repetition of many previous ones, in which the second, third, fourth and fifth laps have always proven the ones to put machines out of the running for the blue ribbon of motoring.

In enthusiasm and enormous attendance, it was the same old Vanderbilt cup race. As a contest it was the best race ever run for the cup and the fiercest-fought battle an American road race has ever produced. At the end of the seventh round, when 164.22 miles had been run, ten contestants were still fighting it out. Six of them at this point had yet winning chances, less than 15 minutes separating the leader from the tail-ender of the sextet. These nine were still running when the race ended, which certainly reflects great credit upon the builders of modern motor cars.

George Robertson and Willie Haupt divided the honors of leadership, the Locomobile setting the pace for three rounds, and then the Chadwick captured the running for the next three laps. The Locomobile had experienced slight delays, but they were sufficient to put it back in the ruck, so close was the contest among the leaders. Throughout the race the Isotta, running steadily and consistently from start to finish under Lytle's able pilotage, never lost its position in the pacemaking trio. Emile Stricker was also in frequent evidence in second and third place with Robert Graves' Mercedes until the tenth round, when the Mercedes entered by the cup donor got a grip on third place that

FASTEST LAPS IN RACE

Driver.	Lap.	Time.	M.P.H.
Robertson	3	20:17	69.4
Robertson	8	20:26	68.9
Robertson	7	20:36	68.4
Robertson	1	20:54	67.3
Robertson	10	20:55	67.2
Stricker	2	20:57	67.1
Stricker	5	21:18	66.1
Haupt	4	21:21	65.8
Haupt	3	21:27	65.6
Stricker	8	21:27	65.6
Lytle	1	21:33	65.4
Lytle	9	21:48	64.4
Lytle	11	21:50	64.3
Lytle	8	21:56	64

BEST TIME EACH LAP

Lap and Driver.	Time.	M.P.H.
1—Robertson	20:54	67.3
2—Stricker	20:57	67.1
3—Haupt	21:27	65.6
4—Haupt	21:21	65.8
5—Stricker	21:18	66.1
6—Robertson	20:30	68.7
7—Robertson	20:36	68.4
8—Robertson	20:26	68.9
9—Lytle	21:48	64.4
10—Robertson	20:55	67.2
11—Lytle	21:50	64.3

REGULARITY OF RUNNING

Driver.	Fastest.	Slowest.	Variation.
Lytle	21:33	23:28	1:54
Luttgen	22:07	27:27	5:20
Robertson	20:17	25:50	5:23
Bourque	24:51	31:13	6:22
Stricker	20:57	29:42	8:45
Denison	24:33	34:17	9:44
Florida	22:13	35:69	13:56
Salzman	22:37	41:50	19:13
Haupt	21:21	56:65	34:44

POSITION AT END OF EACH LAP OF THE RACE

No. Car	1st lap	2d lap	3d lap	4th lap	5th lap	6th lap	7th lap	8th lap	9th lap	10th lap	11th lap
16—Locomobile	1	1	1	4	4	2	1	1	1	1	1
6—Isotta	2	3	3	2	3	3	2	2	2	2	2
1—Locomobile	8	5	5	6	6	7	5	5	6	5	3
5—Mercedes	10	8	7	7	7	6	6	4	4	3	4
12—Thomas	4	6	6	5	5	5	4	6	5	4	
3—Mercedes	6	4	4	3	2	4	3	3	3		
2—Knox	11	10	9	9	9	9	9	8	7		
20—Knox	14	9	8	8	8	8	8	7			
8—Thomas	15	11	10	11	10	10	10	9			
4—Chadwick	3	2	2	1	1	1	7	10			
18—Mercedes	16	14	12	10							
7—Matheson	12	12	11								
17—Renault	17	15	13								
11—Acme	9	7									
9—Hotchkiss	7	13									
15—Matheson	5										
19—Thomas	13										

was not shaken off until the last lap.

Robertson gained the lead in the seventh lap. The last five laps of the race were made up of an exciting duel between the Locomobile and the Isotta, with from but 2 to 4 minutes separating them at any time. Robertson entered the last lap with but 3 minutes 50 seconds to his credit over Lytle. Soon after word came that the Locomobile had stopped near Jericho on the back stretch. The grand stand was thrown into a turmoil of excitement and fairly seethed with suspense until a second megaphone bulletin told of his being off again with but a loss of 2 minutes he had taken to replace a tire.

When Lytle and his Isotta had flashed by the stand first past the post there followed minutes of anxious waiting and pent-up excitement that no race ever run in America before had ever called forth. Robertson had started 10 minutes after Lytle and so had that margin in which to finish. Watches were out and anxious eyes shifted from them to the hill up the stretch. Five, 6, 7 minutes passed and no Robertson. Eight minutes and a mighty shout went up as the big radiator of the Locomobile showed itself over the hilltop. It took but seconds for Robertson to dash down the home stretch and across the tape.

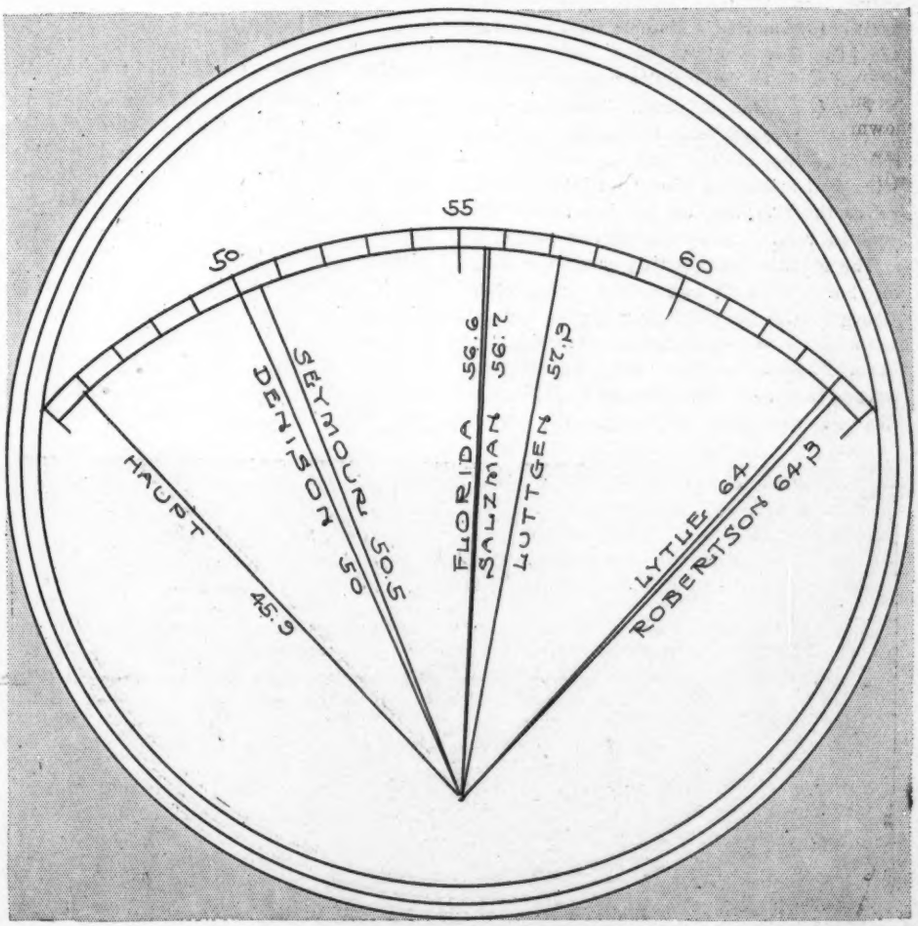
There were seconds of tense waiting for the final word from the timers' stand. It came, and then there arose such a mighty, whole-souled cheer and shout of triumph from the grand stand and the thousands along the home stretch as no Vanderbilt cup finish had ever called forth before. It was a mighty howl of glee and victory over America's first great road racing triumph. That stupendous cheer raised the curtain on a new era for America in international racing. Long patience and stubborn perseverance had at last won out and America was no longer a second-rater among the motor car racing nations of the world.

A wet course during the early stages of the race interfered somewhat with the speed attained by the contenders, otherwise the record would doubtless have been beaten by a broader margin than it was. It had rained for 2 hours before the start and the rain continued well into the second round. It was a gentle rain, however, and even the partially clouded sun later was enabled to dry out the course and give excellent going for more than the last half of the contest.

Though the new course was less accessible than the old circuit and the location of the grand stand was remote and unfamiliar, as has been said above, the same old monster Vanderbilt race crowd was in evidence. It probably did not equal the mighty throng that swamped Nassau county in 1906, but it reached without dispute the hundred thousands and maintained the prestige of the Vanderbilt cup as America's greatest sporting event.

The race was utterly without fatalities and absolutely free from injuries to contestants beyond the singeing of Foxhall Keene's mustache during his attempt to put out a fire on his Mercedes. In fact, an accident apiece to cars and spectators was the sum total of casualties to onlookers. Jim Florida at the finish bumped into a touring car and damaged its radiator and in the mix-up a young man was thrown to the ground and had his leg broken.

To tell the unvarnished truth, the preparations that had been made to handle the crowd and guard the course proved to be inadequate. The instinct of self-preservation did more to save the crowd from injury than did the private militia company that had been obtained or the Pinkerton men and the deputies that had been hired. There was an insufficient number of guards to make the wire fence barrier efficient. Hundreds scaled it and crowded those that had paid big prices for choice parking spaces along the home stretch. At the finish there was a rush of hundreds to the space in front of the grand and official stands. The supply pit hose pipes were brought into play with some momentary success, but they only checked the onrush temporarily and then the home stretch was again overrun, and Referee Vanderbilt was compelled, for safety's sake, to call the race off with the passing of the victor by the tape. There was also confusion anent the directions for reaching the parkway entrances and parking spaces. To most motorists the region of the parkway and the location of the toll gates were unfamiliar.



SHOWING AVERAGE SPEED OF EIGHT CONTESTING CARS

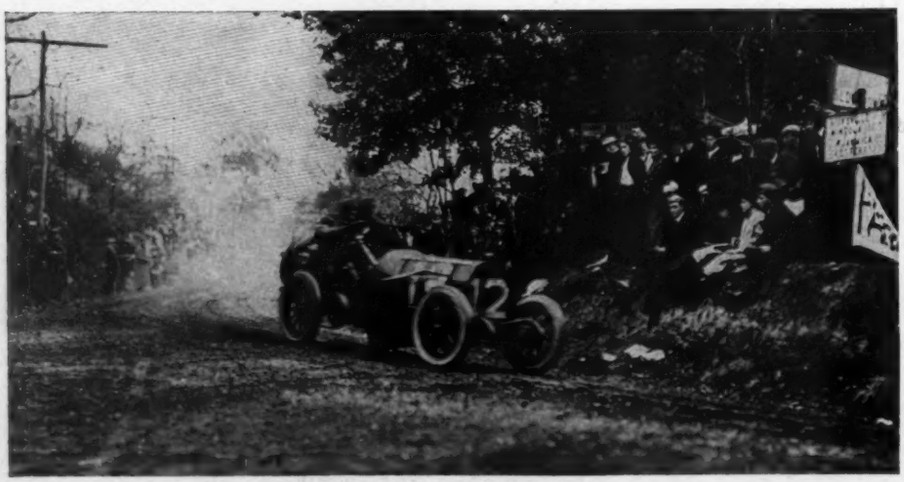
MRS. VANDERBILT

LAP BY LAP WITH

CHADWICK MAKING GREAT HEADWAY

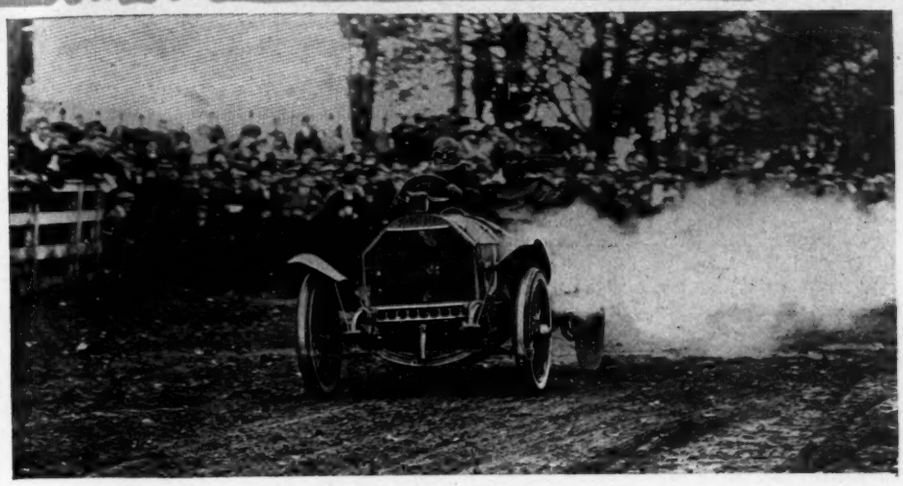
LONG ISLAND was clothed with gloom and moisture. All through the night and long towards morning a starlight sky had eradicated the omnipresent thoughts of rain which the warm eastern wind of the day previous to the race gave promise of. With morning hours the sky was quickly overcast. At 4 o'clock rain began falling on many parts of the island; at 5 o'clock it had become a deluge, and the long lines of motorists headed for the parkway were forced to scamper to roadside hotels. It looked as though Nature had turned traitor to America's historic road race and that the fine weather that favored the three previous Vanderbilts was at an end. A sudden change came, however. The downpour ceased and the grey morning dawned—the clouds started moving. A wind had arisen—a wind that later was to prove the salvation of the day and which was in reality a herald of the sunshine.

The seventeen contesting cars were early on hand, and it was just 5:30 when George Salzman reached the grand stand with his Thomas. In quick succession the other sixteen followed, and a good hour before the start was made at 6:30 Starter Wagner was busy arranging the speed monsters in their starting order. At this time a slight rain was falling. It was impossible to think of starting at 6 o'clock. Then the time was placed at 6:21, and later came the announcement of a 6:30 start. At 6:15 rain was still falling, and drivers and mechanics were busy replacing plain treaded tires with a steel-studded type. Before 6:20 the rain had ceased; great streaks of clear sky indicated a bright day, and the track was rapidly clearing of cars that had reached the grand stand along the parkway. A couple of minutes before 6:30 Florida and his Locomobile moved to the starting line; Referee Vanderbilt and Chairman Thompson, robed in wet weather togs, were at the line to see that everything was ready. Wagner took his place at Florida's shoulder. Sam Butler was at his right with a chronometer. Amidst the roar of the Locomobile could be heard the starters "ten," "nine," "eight," etc. Then came "two," followed by the long waited for "Go," and the Locomobile was off, setting a pace at a fast clip. A mighty cheer followed his departure. A minute later Denison made a speedy departure, his Knox crossing the starting with a mighty roar. Stricker's Mercedes No. 3 left a trail of fire behind it as the steel-studded tires spun on the cement parkway. Haupt Chadwick, No. 6, stood panting at the line, not belching out cannon broadsides as some of the previous ones had, but quietly purring until the last second, when an opened throttle translated this into a battle roar, and an instant later the first six-cylinder contestant was off. A few feet from the starting line Haupt changed gears. Lytle got a good start with his Isotta. Following him, Ryall in the Matheson made an equally auspicious departure, and all of the others made a good getaway with the exception of Strang, whose motor stalled as it reached the starting line. The car was unable to start and later was pushed by the officials off to the side of the course, where 28 minutes' work was necessary before it finally got away. Robertson's start was by far the most enthusiastic, the crowd cheering to the echo as his big Locomobile crossed the line and disappeared under the bridge, a half mile beyond. After Bourque in his No. 20 Knox, the last car to start, was well away it was a short wait until "car coming" brought everybody to their feet to salute the No. 1 Locomobile as it shot past. The cheers for George Robertson were many and loud.



SALZMAN IN THOMAS AT HAIRPIN TURN

The RACERS



CROWDS WATCH STRICKER PASS

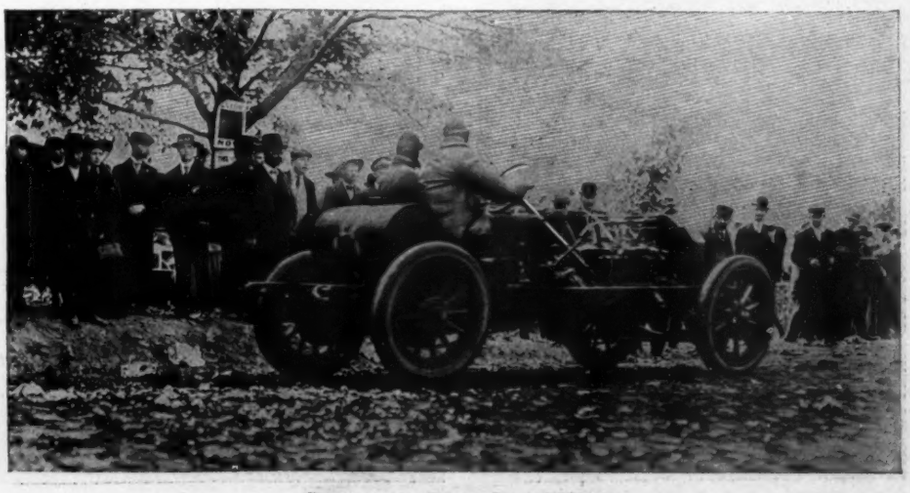
W. K. VANDERBILT, JR.

During this brief lapse of not more than 5 minutes Announcer Peter Prunty told of the passage of several cars along the Jericho pike and along by Westbury. It was startling not to hear of a single bit of misfortune on the first lap, and everybody seemed pleased that fate was favorable, if weather was not. But, as discovered later, the Jericho pike had not suffered because of the rain, and from the first lap, as shown by Robertson's time, all of the contestants were able to drive as fast as the motors were capable of taking them. On the Parkway stretches skidding was impossible with the steel treaded tires, the cars even passing through shallow pools of water at top speed.

First Lap, 23.46 Miles—With all the seventeen cars under way came a craning of necks up the stretch for the first car that should heave into sight. There was less than 5 minutes of waiting, for at 6:53:10 Jim Florida in the pacemaking Locomobile shot by, having completed the round in 23:10. Next Stricker in Mr. Graves' car, the Jenatzy Mercedes, passed, having overhauled and passed the Denison Knox, which had started second. Willie Haupt was also burning up the road with the Great Chadwick and had also gotten by the Knox. All the time Robertson was climbing up the steps of the racing ladder, and though Chevrolet, too, was hitting a hot pace with the Matheson and had started a minute ahead of the Locomobile, it was cut down by the favorite. Word came from the back stretch that Mercedes No. 18 was afire, the gasoline having ignited. It was another case of hard luck for Foxhall Keene, who in the 1905 race had banged into a telegraph pole on the hairpin turn. He finally extinguished the flames and finished his first lap after the leaders had completed a couple of circuits.

Robertson completed his first round in 20:54 and in actual time was the leader in the race. As he finished his lap he slowed down at his pit to take on water and oil. It was feared from his seeking fuel so early that his engine was heating, but he was up and away again in less than 2 minutes. Already Robertson had gathered a margin of but a couple of seconds less than a minute on his nearest pursuer, the Isotta. Lytle and Haupt had had a neck-and-neck race for the place, the former capturing it by a second. They were being chased by Chevrolet and Salzman, less than 15 seconds behind them, the Thomas leading the Matheson by but 5 seconds. Florida, Patschke and Luttgen followed in order. The field was running well, only Keene having encountered any obstacle. Despite the slippery going, the leading trio were running among the records, Robertson with an average of 67.3 and Lytle at a 64.50 miles rate.

Second Lap, 46.92 Miles—The speed honors of the second round fell to Haupt and Lytle. The Chadwick by a lap in 21:29 made up the 1-second lead and gained 4 seconds besides on the Isotta. Stricker was making a splendid run in the Mercedes and put up a 21:58 lap to his credit. Despite his stop for water, which came out of the second lap, Robertson had spurted so hard that his gross for the round showed 22:15, and he still held the lead by a margin of 15 seconds. Florida, too, was holding up his end of the Locomobile plank in fifth place, and Salzman and the Thomas hung stubbornly to the sixth. This sextet was running with a margin of but 3 minutes separating the first and last man. The indomitable Keene made a plucky run after he had extinguished the fire in his carbureter, covering the second lap in 22:32. Strang had gotten the Renault going, but it was somewhat in the doldrums and no greater speed than 23:58 could be gotten out of it. In this round Chevrolet's fight in the

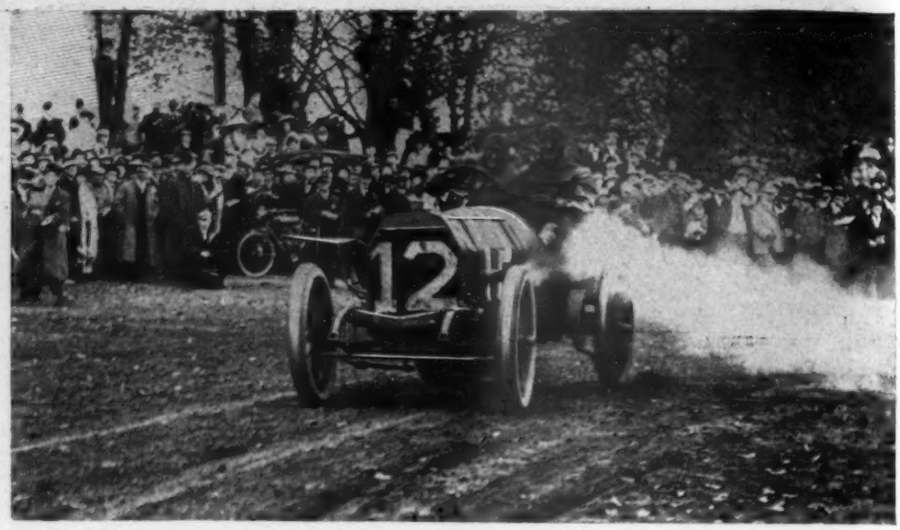


SEYMOUR IN GRAND PRIX THOMAS

Matheson was stopped for good by a cracked cylinder and the Baltimore youth, Howard W. Gill, had his road racing debut nipped in the bud by the gears of the Thomas refusing further to work. Chevrolet had made a fine first lap in 22:09, and the Matheson's downfall greatly disappointed those who had expected much from the new Matheson racer.

Third Lap, 70.38 Miles—It had rained a bit during the first lap, but had let up during the second. By the third round the sun, though veiled by mist, showed itself and set to work to dry out the course and made good progress. With his signal men informing him how close were the Isotta and the Chadwick at his heels, the dare-devil in Robertson's make-up asserted itself and he put spurs to his motor steed. He had made laps in practice over a dry course in 20:00, but he still had a wet and slippery road ahead of him now. So daringly did he take the turns and so unerringly did he pilot his flyer down the straights along the country roads and over the roller coaster hills of the cement stretch, that he took unto himself the fastest lap in the race—a 23.46-mile round in 20:17, showing a rate of 69.6 miles per hour. Even at that rate of going the Chadwick in 21:27 was still but 25 seconds behind him, and the sure-footed Isotta less than 2 minutes to the bad. Stricker and Florida were holding stubbornly to fourth and fifth places, still pursued in order by Salzman and Luttgen. Both of the Knox machines were putting up an excellent race for stock cars of medium power, each gaining a place higher up in this round. In this circuit the Hotchkiss fell by the wayside with a broken clutch, and the Acme went out with broken gears. Kilpatrick had covered the first lap in 22:09, and Patschke had scored 23:23 for the same circuit.

Keene well sustained his reputation as America's crack amateur by his driving of his veteran Mercedes. He had made his second lap in 22:54. He bettered this in the third round by putting up a circuit in 22:18. There were mighty few professionals in the race beating the Long Island fox-hunter.



SALZMAN IN THOMAS RACER AT WOODBURY

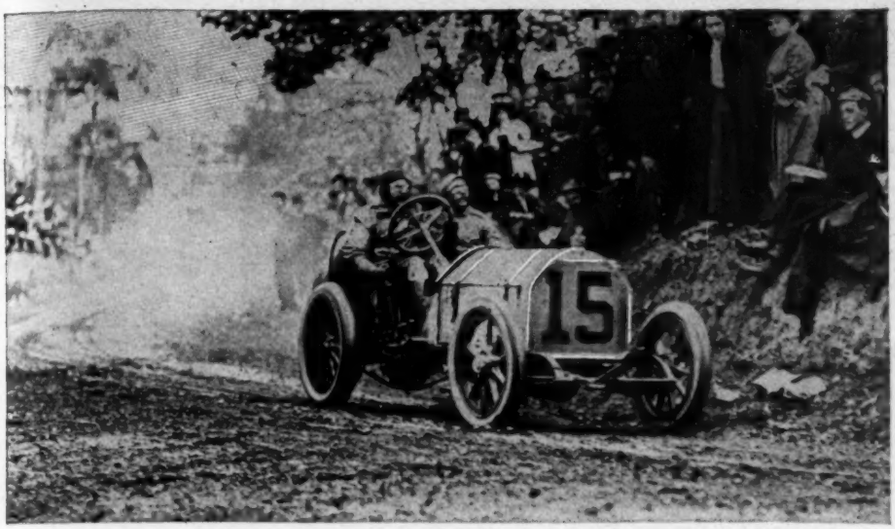
Fourth Lap, 93.84 Miles—In the fourth round Willie Haupt put up the whirlwind lap that landed the Great Chadwick six in the lead and set the wise ones to wondering for this and two succeeding laps whether after all a dark horse might not spring a surprise on the much-touted trio of favorites and furnish the new American champion. Haupt had claimed for himself 20:40 in practice. Despite going that was not yet the best, he cut loose for fair and covered the course in 21:10. Lytle also got a few more notches of speed out of the Isotta and showed 22:04. In fact, the entire sextet of leaders ran this round at marvelous speed, Stricker scoring 22:23, Luttgen, 22:23, and Salzman, 22:31. Down among the luckless tail-enders Keene's light shone even more brightly than that of the vaunted leaders with a round in 22:10. All this hurrying and scurrying happened while Robertson was laid up at his pit at the grand stand looking after his tires. He put a new one on the rear wheel and shaped two others to his car for emergencies. It cost him a delay of over 3 minutes. This was enough, however, to put him into fourth place, so close were Haupt, Lytle and Stricker at his heels. All this time Strang was plodding along away back in the ruck under a hopeless handicap of close to 30 minutes, incurred by his delay at the start. A burnt-out clutch finally put him out of his misery and the race in this lap. The relentless law of compensation had gotten in its fine work at last on the winner of three American road races and laid him low.

Fifth Lap, 117.30 Miles—Haupt continued his impressive run with the Chadwick and again in the fifth round scored the fastest time, 21:36. Further down the line Florida and Stricker were also putting in great licks of speed with rounds of 21:38 and 21:40. Lytle had slowed down to 23:28, and even Robertson with three cars still ahead of him was doing no better than 22:23. Stricker got by Lytle and Robertson failed to improve his position. In fact, Stricker's gain of a place was the only change in the whole time. Haupt was now but 27 seconds ahead of Stricker, who led Lytle by 37 seconds. It was a race for fair. Robertson had gained on Lytle, but was losing to the Chadwick and Mr. Graves' car.

Sixth Lap, 140.70 Miles—Robertson now began to realize his danger and drove like a speed demon indeed. Covering the course in 20:30, he swept by Lytle and at the end of the lap was in second place, but with a margin of 1 minute 13 seconds separating him from the flying Chadwick. Lytle had spurted down to 22 minutes flat and Stricker had fallen over 3 minutes behind the flying trio of leaders. This quartet was opening a wide field on the pursuing field.

NO. 2 KNOX PASSES

ACME RAN WELL IN THE FIRST ROUND



CHEVROLET IN MATHESON ON HIS FIRST AND ONLY ROUND

Seventh Lap, 164.22 Miles—At 9:07 word came that Haupt had stopped near Bethpage and that Lytle had passed him. At this time the Chadwick was not only leading in actual time, but heading the procession as well. He had some trouble with a loose chain, but it was a balky magneto that was his undoing. From here on, though he continued in the race, he no longer was a factor. He had put up a brilliant performance and demonstrated that the Chadwick is a car to be reckoned with in future in any company. The race had now become a duel between Robertson and Lytle. With the falling back of Haupt, the Locomobile had once more assumed the leadership. Putting up another lap in 20:36 as against Lytle's 22:05, he led the game Isotta that needed nothing but a wee bit more power and speed by 2:09 at the end of the seventh round. With Haupt out, Stricker again got in the leading trio with Mr. Graves' car.

Eighth Lap, 187.08 Miles—The contest had now narrowed down to a match race between the Locomobile and the Isotta, though Stricker was some 5 minutes behind with the Mercedes, his only chance lying in an accident or more than a normal tire repair or fuel-filling stop. Calamity came to Salzman in this round. The Thomas had been running smoothly and well, scoring its laps in from 22:31 to 24:13. At the end of the preceding lap, which it finished in fourth place, it was tied up in front of the grand stand with an ill-fitting rim. It took Salzman fully 20 minutes to right it and this delay caused him to drop from fourth to sixth place. In this round Robertson pulled away a bit from Lytle and led him 3 minutes 29 seconds.

Ninth Lap, 211.44 Miles—Robertson slowed down a trifle in this lap to a 22:22 gait, and Lytle kept the Isotta at its limit, scoring 21:48. The Italian car showed the same even pace it has displayed in all its races. Up to this point its fastest lap had been done in 21:33 and its slowest in 23:42, a variation of but 2 minutes 9 seconds, fuel replenishment stops included. Lytle was only 2 minutes 55 seconds behind Robertson. It was not for the Locomobile to falter. In fact, a tire replacement or a stop for fuel might cost it the race. "I just drove the Isotta at its best all the way," said Lytle, "and that was all I could do. The car could go no faster and its fastest was not fast enough to beat the big Locomobile." That about told the story of the Isotta's game fight. Stricker still stubbornly clung to third place.

Tenth Lap, 234.60 Miles—Once more Robertson quickened the pace of the Locomobile and pulled away a bit further from the Isotta, their respective circuits footing up 20:55 and 22:10. It was in this round that Graves lost his grip on third place with Mr. Graves' Mercedes. Stricker stopped at the Locust Grove station to look after a leak that had developed in his radiator. When he lifted the hood he saw that the fan had come loose and run amuck, ripping a hole in the radiator, and that he was out of the race. This let Mr. Vanderbilt's Mercedes into third place, while the Salzman Thomas moved up into fourth position, closely pursued at a 2-minute margin by Florida in the Locomobile.

The Finish, 258.06 Miles—Entering the last lap, Robertson began his run over the homestretch with a margin of 4 minutes 10 seconds. Lytle, however, it must be remembered, had started 10 minutes before Robertson, and so was first to start the last round. Though the Locomobile had the race well and safely in hand, barring accidents, there was always the possibility of a stop for one cause or another. Robertson had been on his last circuit some 10 minutes when the announcement was bellowed by Peter Prunty through the megaphone that the Locomobile was off the road near Locust Grove. The excitement had hitherto been great. It became a tumult now. It raged for 2 minutes and then came the message that the favorite was on the road again and on his way. A great cheer went up. It seems that a skid had sent a tire to the bad. It took him 2 minutes 10 seconds to unlimber a fresh tire and make the replacement. Then Lytle finished his run. All those at the finish whose eyes were not glued to their watches gazed eagerly up the stretch. Seven minutes passed and no Robertson. Eight minutes came and with it the Locomobile over the top of the hill, half a mile away. In less than 30 seconds he had flashed by the stand. "Time! Time! Time!" yelled the crowd. It came quickly for once, "240 minutes 48⅕ seconds." Robertson had won by 1 minute 48⅕ seconds. Thousands cheered themselves hoarse at America's first international road race victory. Then came the rush of the crowd over the course that caused Referee Vanderbilt to call off the race.

HOTCHKISS AND NO. 7 MATHESON AT WESTBURY

BOURQUE ON BACK STRETCH

Mechanical Mishaps of Cars

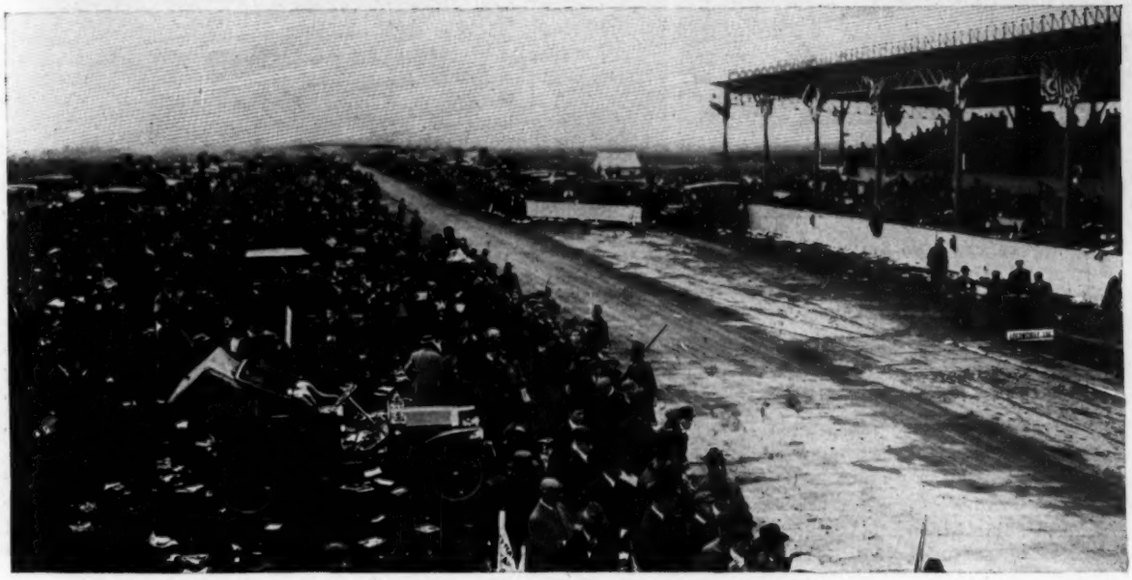
EVEN THE SOLDIERS COULD NOT KEEP CROWD BACK

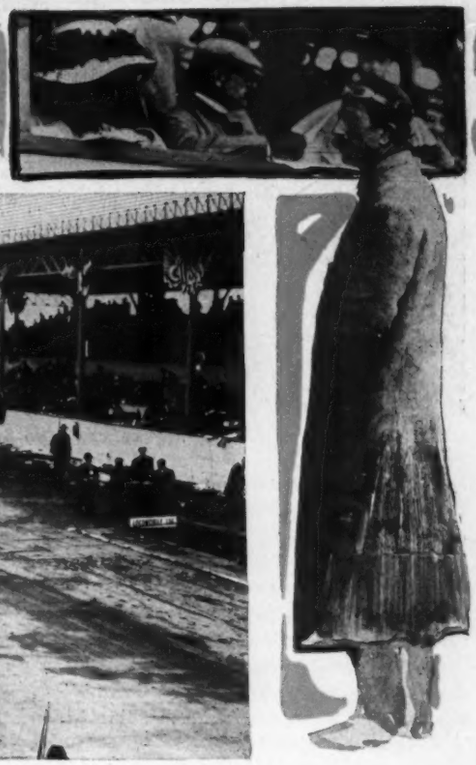
THE triumph of American motor car engineering and manufacturing was well evidenced in Saturday's race by the fact that at the time the race was officially called off seven of the eleven American cars that started were running in good shape, whereas but two of the six foreign machines were running. America had 63.6 of its cars working; Europe had 33.3 per cent of its racing creations still active in the conflict. Of the eleven cars that ran under American colors five can be designated old machines, their debut into road racing dating back to October, 1906, when they contested either in the eliminating or final trials. Robertson's winning Locomobile and the other driven by Florida were built for the 1906 event, but have been renovated since only to the extent of installing a selective type of gearset to take the place of the progressive type the Locomobile company was fitting in its machines a couple of years ago. In other respects these two cars remained unchanged. The two Thomas cars, Nos. 12 and 19, were the same as were seen 2 years ago, but altered in appearance by the use of cylindrical transverse gasoline tanks in place of the type previously used in which the seat was incorporated with the tank. There were other minor alterations. Ryall's Matheson also was a 2-year-old, save that not a few improvements had been added which were not of sufficient import to eradicate the characteristic lines it originally carried. Of these five three were running in good shape at the finish, one being the winner and the other absolutely certain of third or fourth place had the officials taken the pains to have kept the course clear and allowed at least five cars to finish. The performance of these five is such as to warrant the inference that 2 years ago America had solved to a large extent, in one or two factories at least, the problem of building enduring racing cars, even if at that period its drivers were not the equal in experience of those bred abroad.

The six newly-constructed American machines gave a good account of themselves and four were running with the utmost regularity at the finish, the grand prix Thomas, the Chadwick six and the two Knox machines being the quartet. At the end of the sixth lap the Chadwick was leading the field by a margin of 13 seconds and running with great ease and regularity; but lap seven was its Waterloo, in which a couple of magnetos went out of commission and necessitated running the last 8 miles to the repair camp on three cylinders. In one magneto the distributor pin sheared off, the other short-circuited in the armature. It took 56 minutes 6 seconds to complete the lap and by that time

PRIVATE GRAND STAND ERECTED BY F. H. SEELICK, JR.

In the Vanderbilt Cup Race

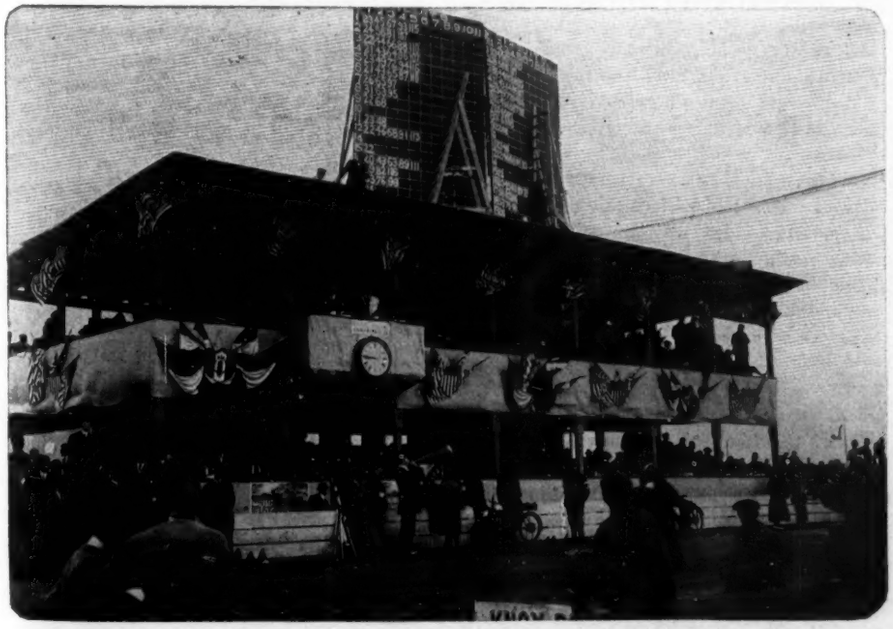




SPECTATORS MASSED ON BOTH SIDES OF ROAD NEAR GRAND STAND — KEENE

a six-cylinder contestant on which many enthusiasts had banked on being a considerable factor in the race was eliminated. The car also had trouble due to adjusting of the right driving chain. In the race the cases for enclosing the drive chains between the jackshaft sprockets and rear wheel sprockets were used.

The grand prix Thomas No. 8, driven by Seymour, did not show fast speed at any time, but evidenced regularity in the eight laps it completed. The other two cars to keep in the running were the two Knox machines, piloted respectively by Denison and Bourque; Denison having finished nine laps and Bourque eight and reaching the grand stand unofficially on the ninth. Bourque's machine holds the distinction of being the lowest-powered racer on the parkway, having a horsepower of 38, according to A. L. A. M. formula. In spite of this lack of power it negotiated laps in 24, 25, 27, 28, 31 and 32 minutes, a performance of commendable regularity. Denison's car is a high-powered and faster one and got a mark of 22:01 in the second lap, which proved to be its fastest. Both of these cars are alike in motor design, but differ in that the Denison machine is chain-driven and Bourque's shaft. Both are characterized by motors having intake and exhaust valves carried side by side in the cylinder heads and with overhead rocker arm actuation.



ANNOUNCER PRUNTY KEEPS THE CROWDS WELL INFORMED

It is to be regretted that two of the new American cup contestants should have been forced to withdraw early in the race, the Acme six in the third lap and the Matheson in the second lap. The Acme started off on the first two rounds with a regularity that recalled its consistency at Savannah last spring and critics started to look for a repetition of that performance. A long wait for the completion of lap three frosted the expectations and soon a special telephone message to headquarters brought the information that one of the timing gears on the engine had broken and incidentally had wrecked the gear on the other camshaft. This necessitated immediate withdrawal. From a representative of the company it was learned that both of the camshaft gears are made of manganese bronze, a metal highly capable of withstanding the heaviest service; but it seems that the accident was simply one more case of racing luck—a misfortune which might have been avoided by a longer practice period. This car being the other six-cylinder contestant, much interest centered in its performance. Many were watching the working of the sixes, but as the Acme shared misfortune with the Chadwick, though much more seriously, the American public will have to wait for another race before the battle of the sixes will be in more tangible form. From a standpoint of tire wear it is inter-

SOLDIERS ON DUTY AT GRAND STAND

KEEPING CROWD OFF THE COURSE

esting to note that the Chadwick six in the eight laps it completed and in the unofficial ninth had not to make a single tire replacement, and a cursory examination of the tires as the car stood in front of the grand stand after the race was called off failed to discover any traces of extreme wear that would tend to indicate that a change would have been imperative before the end of the race had the machine been privileged to finish.

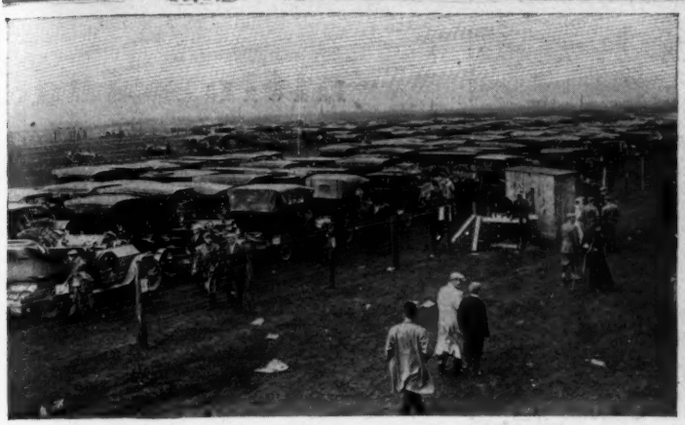
The Chevrolet Matheson encountered hard luck on the second lap when the cracking of a cylinder worked its speedy elimination, although the car did not suffer any other troubles. This car is a four-cylinder machine in which are incorporated many of the principles of the 1909 cars which it is said will differ materially from the present models. The car is a shaft-driven type and made a most favorable impression by its quick and easy getaway. The car was held at the tape for some time and the anxious Chevrolet had crowded it a little too close to the starting line which compelled Referee Vanderbilt and Chairman Thompson to push it back a few inches. The first lap was made in 22:09, and it is safe to affirm that, barring misfortune, the machine would have shown well up by the finish. This car uses a left side exhaust instead of the right as on the old Matheson, and its value of such in a race is considerable in that there is much less danger of the smoke getting in the driver's face.

In Ryall's Matheson the exhaust is taken out through the bonnet particularly high on the right side and over the carbureter and it is doubtless owing to this scheme that the car reached the grand stand on the last lap with flames shooting from the mud apron. The initial trouble and undoubted cause of the fire came when the driver hit a cement bridge too near the right side and at too high a pace, the result being a badly sprung rear axle at the right, while the right rear wheel splayed at the bottom. This quick jerk, due to hitting the bridge, shot the gasoline upward out of the carbureter, the vapor from which was quickly ignited because of the proximity of the hot exhaust pipes. To accentuate the danger was the fact that on this car the carbureter was slightly higher than ordinary, bringing it still closer to the exhaust. The fire had nothing to do, however, with the withdrawing of the car, whose retirement was directly due to a short-circuiting of the armature winding of the magneto. From the end of the fourth lap until near the finish of the contest the driver and mechanic worked over the magneto without result and the car remained at the pit in front of the grand stand until the race was over.

Robertson's Locomobile which made so admirable a performance from start to finish was never in trouble except during the first lap, and then there was nothing of a serious nature; but there might have been. Robertson, while waiting for the start, made the mistake of which many drivers have been guilty; namely, starting the motor too long before his minute for starting. It was fully 9½ minutes before he was sent off by Starter Wagner that Robertson had the big motor shooting sheets of flame out of the two holes in the left side of the bonnet. During this time the water supply in the radiator was being consumed, as the car has not a fan behind the radiator to assist in the cooling. Before leaving the starting line steam was coming from the radiator and many were anxious about it. The proof of their anxiety came at the end of the first lap when Robertson stopped at his pit in front of the grand stand and took on water, losing exactly by stop watch 2½ minutes, which counted against him on his second lap, as he had to cross the finishing line before reaching his pit so that the time counted against his second circuit, which was almost 2 minutes in excess of his first. But after that first lap his troubles or even apprehension of such were at an end. That the mixture was good was demonstrated by the flame color when waiting for the start and on every successive lap the cylinders were firing with uniform force and the utmost regularity. On the start of the fourth lap Robertson stopped at his pit in front of the grand stand and took on a new rear casing. On starting the ninth lap he stopped 2 minutes 16 seconds to take on gasoline, water and oil. This was his last stop in front of the grand stand and the crowd had occasion for a little amusement when Chairman Thompson ventured too near the car when the mechanic was filling the gasoline. In this portion of the repairs the rules of economy tests were thrown aside; 5-gallon gasoline cans were inverted and it rarely

OVERHEAD BRIDGE BELOW GRAND STAND

SALZMAN TAKES BRIDGE AT FAST CLIP



SPECTATORS' CARS ARE PARKED TOGETHER

MAXWELL PARKING SPACE

happened that the first few quarts reached the tank, but were spilled over the outside. At the time in question a double supply went over the tank and splashed relentlessly over the chairman, who took it good-naturedly. After this Robertson's only stop was when he threw a tire in the last lap and the report was spread that he had run off the road into a bush, the fact being he had backed slightly off the road to be out of the way of the other cars when making the tire repair.

Robertson's Locomobile is to all intents and purposes a typical Locomobile, excepting in that when the car was made 2 years ago the weight limit was 2,204 pounds and several alterations in cylinder casting design were used in order to reduce weight. One was the use of copper water-jackets for the cylinder sides. The stock Locomobile make-and-break ignition scheme was used with current supplied by a home-made Locomobile magneto as regularly used. The car carries such accepted Locomobile stand-by constructions as side chain drive and cone clutch in the flywheel. The car carried for the protection of the driver a leather fender on the right side, a scheme used on many of the other cars, and had the front and rear springs wrapped and fitted with Hartford shock absorbers. The car's appearance throughout the run was enhanced because of the full body equipment of dash, footboards, etc., giving it the appearance of a complete car and not a skeleton machine like a few of the others in which floor boards and other parts were wanting. Florida's Locomobile was an equally complete machine and Robertson's car had all springs wrapped and provided with shock absorbers. The right front fender was also on.

FIRE DOES NOT STOP RYALL

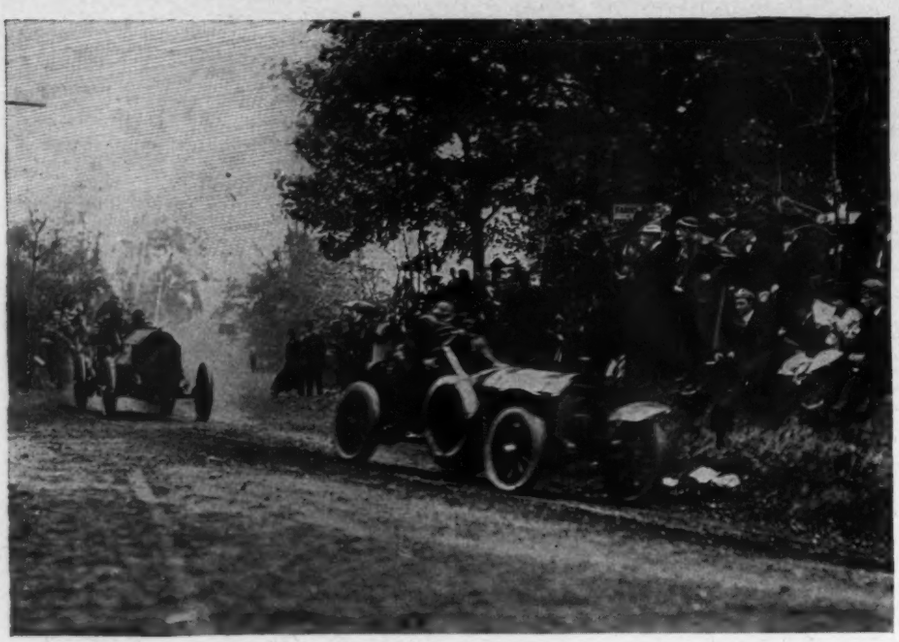
It will be a long time before road races will eventually have solved the problem of car standardization. The varied designs indicate this. Of the seventeen cars that started, thirteen were chain-driven and four shaft-driven, the latter class including Bourque's Knox, Strang's Renault, Chevrolet's Matheson and the Hotchkiss. It is rather interesting to note that only one of these was running at the finish, the cause of their elimination, however, not being due to shaft drive. On the chain-driven cars the Chadwick was the only one to make use of chain casings. The examples of low-tension make-and-break ignition were the two Locomobiles, the three Mercedes cars and the Matheson. All of the others used jump spark with magnetos. In motor design plenty of variation, appeared, the Acme, Knox and grand prix Thomas serving as examples of individually-cast cylinders, while practically all of the other cars had cylinders in twin castings. In the Locomobiles the intake valves are in the cylinder heads and operated by rocker arm, and in the two Vanderbilt Thomases the intakes are directly above the exhausts in valve chambers on the left side, and are opened through rocker valve action. This is sufficient to show that the tendency is very strong in racing cars to locate one set of valves in the cylinder head and in some cases to put both sets in this position if room permits.

The additional lubricating facilities for a racing car will always be an interesting factor, equally interesting, as is the continuous pumping of oil to the crankcase by the mechanics of many of the cars. The majority of them use large cylindrical oil tanks, some of which are carried between the gasoline tank and the seat, others on the dash—as in the case of the Hotchkiss—and one or two on the floor board in front of the seat, as used on one of the Mercedes. The large reciprocating oil pump in the footboard is with a majority of the racing cars an absolute necessity, and is an indication of the large quantities of oil necessary.

Many of the contestants showed inexperience by the small filling caps for the gasoline tanks as well as the oil tanks, and to these may be added the radiator caps. Undoubtedly the best example of large filling caps was Lytle's Isotta. When he stopped to take on supplies in front of the grand stands a funnel of sufficient size was used so that three 5-gallon gasoline cans could be dumped on end into it at once, while the mechanic held a fourth 5-gallon can aloft and simultaneously emptied its contents into the funnel. By having each of the 5-gallon cans with specially large spouts, the work was done all the quicker. The oiling arrangements on this car were such that but a matter of a few seconds was required to empty a 5-gallon can into the oil tank. In contrast with this extraordinary preparation was

(Continued on page 21.)

ONE OF THE UNOFFICIAL STANDS



STRICKER AND HAUPT IN BRUSH AT WESTBURY

HAUPT IN THE CHADWICK STRAIGHTENING UP AFTER TURN

THOMPSON, MORRELL, RIKER AND WAGNER

Ignition and

NEARLY every event of classic importance that has been run since the motor car attained to a degree of development where its design was no longer a matter of guesswork, has demonstrated that cooling water is a prolific source of misfortune. Right from Robertson, whose Locomobile lost 2 minutes on the first lap on this account, down to Stricker and Keene, of the Mercedes trio, who were placed hopelessly out of the running at an early hour, the range extended, and there were not a few others who found the necessity of replenishing the radiator an imperative duty before they had gone very long in the race.

But some of the drivers whose misfortunes consisted of lack of sufficient cooling water, were not so fortunate. Seymour, in the No. 8 Thomas grand prix car, made no fewer than three stops at the Locust Grove repair station for the purpose of refilling the radiator, though like Robertson, his chief loss was in the time consumed. In the case of some of the others, it was a far more serious matter. In fact, two of the Mercedes entries, those handled by Foxhall Keene and Stricker, were retired on this account. When he returned to the stand on foot, in exactly the same manner as characterized his triumphal appearance during the second half of the 1906 Vanderbilt, and attired in the same clothes, Mr. Keene explained to Referee Vanderbilt that a leaky radiator was the primary cause of his troubles, though he added that more real trouble had been condensed into an hour's running than he had ever been put to before in his entire motoring experience. The gradual loss of the water caused the motor to overheat to a point where it was no longer safe to run it further, and everything on the motor was brought to such a high temperature that the oil-soaked ignition cables caught fire, effectively putting a quietus on the car's chances.

Of the things most to be dreaded by the racing driver, the petty troubles arising from ignition defections are probably feared more than any other, owing to the great loss of time they usually occasion to right them. They are generally trivial in themselves, but remedying them often means the waste of such an amount of precious time that ignition trouble is naturally the bête noir of every handler of the steering wheel.

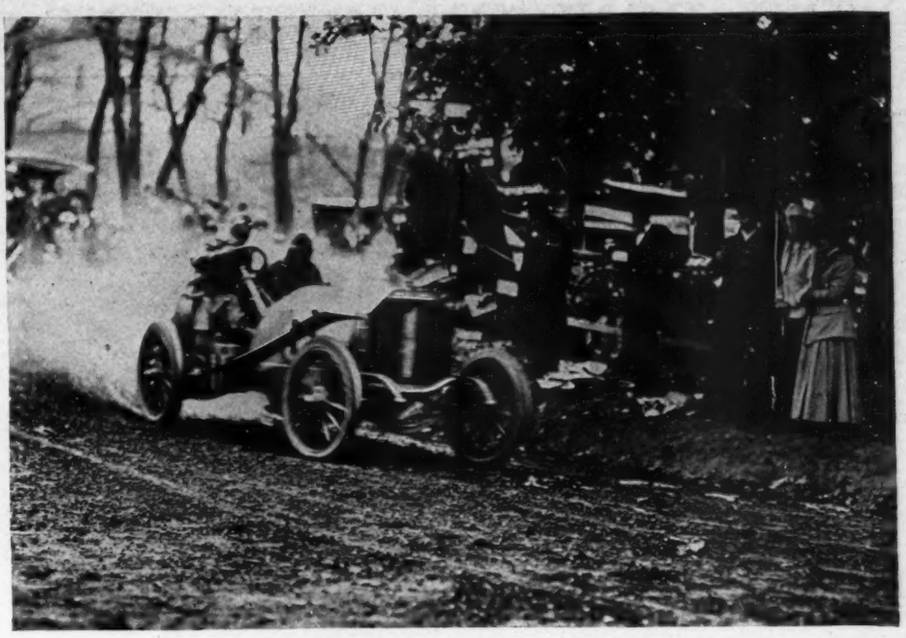
It seems particularly unfortunate that the Chadwick's highly creditable performance, which made Haupt a most likely winner right up to the end of the sixth lap,

Cooling Works

should have been spoiled on this account, as the consistency of the car's running and the great smoothness with which it maintained its lead were remarkable and formed the subject of universal comment at the stand. The tone of the big six-cylinder engine was scarcely a purr compared with the roar of the others, though it was reeling off the miles much faster than the majority of them, and the manner in which it was performing showed that a month's work could not have put a motor in more perfect running condition, as indeed its subsequent examination showed it to be, thus indicating that its defection was entirely due to the failure of the magneto. The Chadwick was the only car in the race that was equipped with two magnetos and independent wiring, but as ill-luck would have it, whatever was responsible for the defection of the one in use at the time, also appeared to affect the other, and even a third, which was taken as a replacement at the Locust Grove control, did not remedy matters entirely. Apart from this trouble, which caused Haupt to consume 50 minutes on the seventh lap, instead of his former average of about 21:25, the only stop was caused by a loose driving chain which inspection showed did not require much attention and which ran the rest of the race as it was.

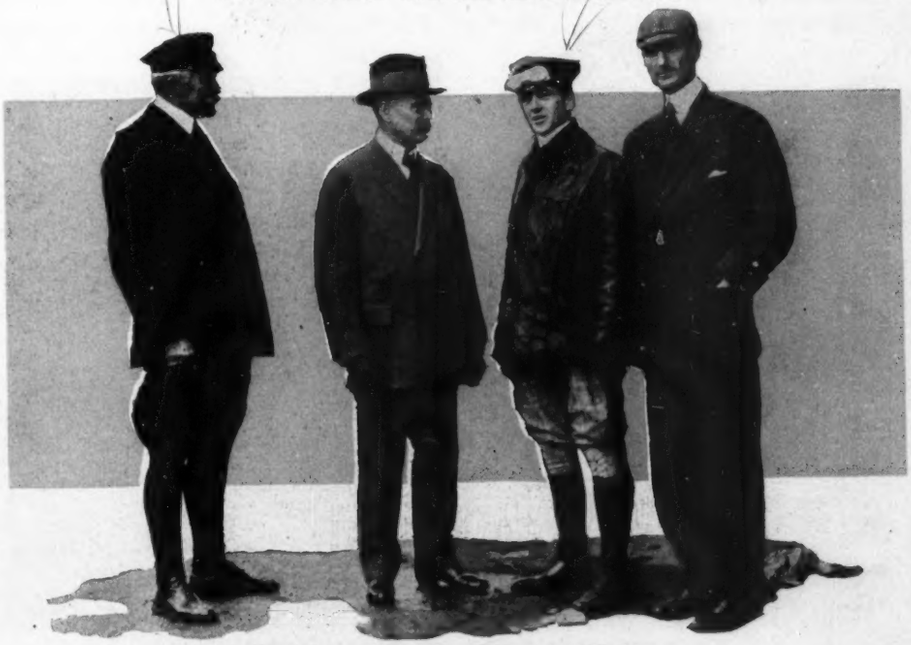
Strang's Renault was the first unfortunate to suffer from ignition trouble, due principally to the fact that the magneto fitted had only been put in place the night before, so that little or no time had been afforded in which to tune the car up with it on. Locating and remedying the trouble, which lay in the interruptor, cost Strang ½ an hour, and his chances were finally ended a few rounds later by the burning out of the clutch leather. Clutch troubles ended the career of the Hotchkiss.

From an electrical point of view, the race was largely a battle of magnetos, as the contesting cars were fitted with the Bosch and Eisemann high-tension magnetos in about the same proportions, the exceptions being the two Locomobiles, with their special low-tension magnetos, and the two Knox entries, which carried Splitdorf magnetos and a Connecticut four-unit dash coil and dry cells for starting. It was noticeable that practically none of the cars, with the exception of the twin-magnetoed Chadwick, had any emergency provision for ignition, all depending entirely on their single magneto outfits, and it seemed to be the very irony of fate that this exception should have been the one to suffer most from this cause.



FLORIDA TAKES TURN AT WESTBURY IN EASY MANNER

STRICKER SQUARES AWAY FOR JERICHO TURNPIKE



THOMPSON, GARY, VANDERBILT AND MCADOO

WORK DONE ON CONTESTING CARS AT REPAIR

NOTWITHSTANDING the fact that the repair camp located at Locust Grove, about half way between Jericho and Woodbury, was fully equipped to meet almost any emergency in the nature of damage, and although each car had provided a separate staff manned by experts from the factories and supplied with every imaginable tool and extra part, there was but little call for any of these. The four racers to pass on the final round managed to dispense with the services of this available control entirely. The large crowd which had congregated at this point was evidently of the opinion that there would be "something doing" in the line of record-breaking repairs and replacements, and was only too eager to surround every car as it pulled up to its stand for gasoline, water or oil.

WORKMEN IN THE PITS IN FRONT OF THE GRAND STAND

The size and inquisitiveness of the crowd were continual sources of annoyance to the drivers who were forced to stop, when every second was precious, as was the case with two of the leading cars which met with minor accidents. There was small cause for wonder that several of the drivers became angry and made the air almost as blue with their vituperations as did the burning oil from the smoking motors.

Locust Grove is located near Syosset on the north side of the straight 2-mile stretch of road between Collier's curve and Jackson's corners, and as this is slightly down grade, it was along here that some of the greatest bursts of speed of the whole race were attained. The entrance to the repair stalls was about 6 inches deep in sand and dust, and one of the most spectacular features of the race was the sight of one of these powerful cars when it suddenly swerved off the main road and came plowing through this soft roadbed, throwing the loose dirt in all directions. This served to attract the attention of the crowd to the unfortunate car, and by the time the tank cap could be unscrewed or the hood unstrapped, a mob twenty deep had surrounded the racer, there to remain until its attention could be attracted by the arrival at the control of another of the contestants. Of course, many of the individuals endeavored to assist the drivers by handing them the necessary tools or parts, but in reality these little acts were more of a hindrance than a help, as it was one of the rules of the contest that the various supplies and accessories should be laid on the counter of the stall before which the car stopped and from there taken to the machine by either the driver or his mechanic.

While there was a total of eleven stops made for repairs, replacements, or replenishments by six different cars, but two of these halts had any direct bearing on the result of the race. The first car to pull up at the enclosure was the No. 7 Matheson on its second round. This car had lost the top nut of the right-hand steering knuckle, and although the car could be operated, high speeding with the steering mechanism in this condition was dangerous. An extra nut was soon found among the bag of spare parts carried on the car, and after a few turns with a monkey-wrench, the car was again on its way, having spent about 6 minutes in repairing the damage. In the meantime, however, the Knox car No. 20 had passed on its second round and the Locomobile No. 1, the Chadwick No. 4, the Mercedes No. 3 and the Isotta No. 6 had all whizzed by, each on its third round.

ROBERTSON FILLING HIS RADIATOR AT START OF SECOND LAP

While this stop of 6 minutes did not put the Matheson No. 7 hopelessly out of the race, its halt again on the fifth round was probably indirectly the cause of its burning a few minutes later farther down the course. The motor had been running badly on this fifth round, and when the stop was made for the second time, it was found that one of the needle valves had been lost, thereby causing the carbureter to form an imperfect mixture. While this needle valve was being replaced, opportunity was taken to replenish the gasoline, water and oil tanks. The gasoline was poured in from 5-gallon cubical cans which had a part of the cover torn off. This did not form a very good spout, and the result was that a large part of each can was spilled over the entire rear part of the car, and it appeared to the spectators as if even the seat was saturated with gasoline. Many who saw this shower bath of gasoline believe that this method of filling the tank was the direct cause of the fire which soon after burst out from that part of the car. Be that as it may, this contestant was effectually retired from the race soon after, but the speed with which the two replacements in question had been made was the cause of many expressions of admiration from the crowd.

On his first round, Joe Seymour, who was driving the Thomas No. 8, passed slowly and called out to ask where the

PITS ON THE JERICHO PIKE BACK STRETCH

SHOWING HOW EACH OF THE GRAND STAND PITS WERE LABELED

supply station was located. Much to the surprise of everyone, he did not stop then, but during his six subsequent rounds he halted three times—once for a new front tire and water and twice for more water. In the meantime it was expected with each round that Strang in his unfortunate Renault would stop for repairs, but he managed to ignore the backstretch repair station until his car was finally forced to withdraw from the race, while Strang sat idly by and looked on.

The two little Knox cars were the center of admiring groups when they each stopped for minor adjustments, notwithstanding the fact that the force of their side exhausts was almost sufficient to blow a man over. No. 2 stopped on the ninth round to strap on a new extra tire, while No. 20 paused on the fifth round to fill the crankcase with fresh oil. This latter car also stopped on the seventh round for a few seconds to replace a spark plug. When No. 20 left the enclosure after its first stop, it started out neck-and-neck with the Matheson No. 7, and the crowd was treated to the sight of an exciting brush down the road. This private race did not last long, however, as it was but a few minutes later that the Matheson caught fire, and Ryall joined the spectators lined up along the course.

The high hopes of the Chadwick adherents for their car were blasted on the seventh round by magneto troubles which developed. This car had started the race in fourth position and at the end of the third round had climbed to first place. It held this position for three rounds and was looked upon as a probable winner on account of its consistent running and the high speed of which it proved itself capable, when this trouble with the ignition was encountered. The fault was found to lie in the magneto, but as two sets of ignition apparatus were carried, the trouble was thought to be remedied easily. The second magneto, however, also failed to work properly, and the car was forced to make a stop at the repair station. Here an entirely new magneto was attached to the motor, wired up, and protected from the mud and oil by a rubber cover. At the same time that this was being done, the tanks were replenished with gasoline, water and oil, and yet the entire delay did not occupy more than 5 minutes. This stop, however, together with the delay on the road, destroyed all hopes of first place for the Chadwick, and thereafter it was forced to content itself with seventh and eighth positions. This car stopped once again on the ninth round for the purpose of tightening a loose chain, but it soon proceeded on its way again without taking the time to make the adjustment. It was on its ninth lap when Robertson finished.

The one other car which had its position seriously affected by an annoying delay was Robert Graves' Mercedes No. 3, driven by Emile Stricker. Although this was the same car which was badly damaged in practice the preceding week when it overturned, its performance was one of the best of the morning, and the racer had been holding second and third positions steadily for ten laps. Stricker had noticed that the motor had become somewhat heated and he stopped at the repair station on his last lap for the purpose of refilling his water tank. The motor was found to be hot and the water tank absolutely empty. On investigation it was found that one of the fan blades had broken and in its rapid revolution had cut several holes in the honeycomb radiator, thus allowing all of the water to leak out. It was feared that one of the cylinders might become cracked if cold water were poured into this excessively hot circulating system, and yet a liquid of some kind was needed to determine the exact location of the leaks in the radiator. The danger of a cracked cylinder was avoided by pouring thin oil instead of water into the radiator, but after a few minutes this produced an unexpected result. When the oil came in contact with the hot cylinder walls it was gradually vaporized and soon burst into flames, which came out of the leaks in the circulating system. This set fire to the gasoline, grease and oil on the outside of the motor and soon the engine was a mass of flames. The fear of an explosion had the effect of causing the crowd to scatter to a safe distance and Stricker and his mechanic were consequently given the elbow room which they probably could not have obtained in any other way. The flames were soon extinguished with the aid of sand and a few pieces of burlap in which some tires had been wrapped, but, as may be supposed, this fire did not serve to cool the engine very much sooner, and these contestants were forced to sit idly by and watch the other cars pass on their way to the coveted finish line. Soon after the race was officially declared to be over,

LYTLE STOPS AT HIS GRAND STAND PIT TO TAKE ON GASOLINE

GASOLINING MADE EASY

the unfortunate Mercedes had cooled sufficiently to allow the water tank to be filled, and it then joined the long line of homeward-bound spectators' cars and finished its eleventh lap at a much slower gait than had marked its progress for the ten preceding rounds.

Although several of the racers suffered from tire trouble, but few of them had occasion to stop for accidents of this kind at the backstretch repair station. In fact, there were but two tire replacements made at this station, and one of these, that on the Mercedes No. 3 was not made until the car had practically been forced to retire from the race by reason of its hot motor. The other replacement was made on the extra Thomas entry, No. 8, but as Thomas honors were easily captured by No. 12, the tire trouble on the former car had no direct results on the effect of the race. The Knox No. 2 stopped once at the control for a new Fisk tire, but this was strapped on the rear with the other extra tires to be used in case of necessity and could scarcely be considered a tire replacement at the repair shop.

Signal Service Used

Many of the entrants displayed signals at this portion of the course in order that the drivers of their cars might be kept informed of their relative positions in the race. The Isotta No. 6, which ran a nip-and-tuck race with the winning Locomobile No. 16, had a large sign displayed at each round showing the difference in time between Lytle's and Robertson's running for that particular lap. Toward the last of the race, when it was a question of seconds as to which would prove the winner, the crowd was kept in a continual state of excitement by the figures on this board. These at no time showed Robertson to be more than 3 minutes in the lead, and when it was announced that he had encountered tire trouble on the last lap, after the Isotta had passed, much apprehension as to the outcome of the race was felt by his adherents. Robertson took every advantage of the straight course and down grade, however, and when he passed the control after having replaced his tires, it was apparent to everyone that his car was going much faster than any racer which had passed at any time during the contest.

Robertson's Performance

It rarely happens in a road race with such a close finish as that between Robertson and Lytle, that the winning car performs particularly consistent, and in this respect Lytle's lap times show greater regularity than Robertson's, owing to fewer stops. Robertson had five of what might be called slow laps out of the eleven, and in contrast with this is the fact that he made four laps faster than any other performer on the course made a single lap. His slow laps were No. 2, 22:13, during which he stopped 2½ minutes to take on water at the grand stand. No. 4, 25:50, during which a tire was replaced on some part of the course. No. 5, 22:23, when he stopped for a minute and a half in front of the grand stand to leave the old tire that had been taken off during the fourth lap and put a new one on the back of his car. No. 9, 22:22, during which he stopped 2:16 in front of the grand stand to take on water, gasoline and oil, and No. 11, 24:12½, when he made a tire change on the back stretch. It is impossible to state the exact length of time required to make the tire

(Continued to Page 35.)

LUTTGEN FILLS UP WITH GAS

The Story of the Tires

IT was a great day for the vindication of pneumatics, to which in years gone by many failures to make a good showing have been laid by drivers. To the perfection of the tire equipment can undoubtedly be laid in large measure the generally good performance of the majority of cars that started, and also to the tremendous speed of the leading machines. The rain that fell during the night preceding the eventful day made it necessary to change all of the tires on all of the racers at the pits in front of the grand stand, steel-studded non-skid tires being substituted for the lighter and faster plain rubber tread shoes, and a pair of extra studded tires and rims being strapped on behind. This occasioned a delay of ½ hour in starting the race. Drivers also asserted that the use of the non-skid tires

AT JERICHO CORNERS—THE GRAND PRIX THOMAS AND THE DENISON KNOX APPROACHING

FLORIDA CHANGING TIRES

In the Vanderbilt Race

and the extra caution in driving that would have to be exercised on account of the slippery condition of the course would slow the running time from 2 to 4 minutes for each lap. Yet much of this disadvantage was made up in the general freedom from burst tires and from tires pulling off the rims. After the race started there were not more than half a dozen stops to change tires at the grand stand and hardly more than that number on the other parts of the course. Stoppages during the race were made in the great majority of cases to take on water and gasoline or because of some mechanical trouble.

The winning Locomobile, driven by Robertson, and the Isotta, driven by Lytle, which won second place, were fitted with Michelin tires. William K. Vanderbilt, Jr.'s Mercedes, driven by Luttgen, which finished fourth, although not officially timed, also had Michelins, while the other Locomobile, driven by Florida, which finished third, was fitted with Diamond grip tires and demountable rims. The two Knox cars, which were still running when the race was called off, were fitted with Fisk tires. Matheson No. 7, driven by Ryall, which caught fire in the pan at the grand stand, and the Acme car were equipped with Diamond non-skid tires. All the other machines not already mentioned were equipped with Michelins.

Robertson stopped at the grand stand on his fourth round and changed his two rear tires as a precautionary measure, fearing that they may have become strained in his terrifically fast third lap made in 20:17. In his last lap he skidded off the road on the S turn at Plainview and tore off the left rear tire, which had to be replaced before the car could be driven on the course again. Exactly 2 minutes 10 seconds were lost at this point, cutting down his lead over Lytle in the Isotta from more than 4 minutes to less than 2.

The showing made by the Isotta with its 55.1-horsepower motor as compared with the higher-powered cars, is to be attributed partly to the fact that it did not stop once for tire changes, so that its performance was very regular, the greatest variation in its eleven rounds being only 1 minute 54 seconds. Vanderbilt's Mercedes changed one rear tire that blew out just in front of the grand stand. Robert Graves' Mercedes blew out a front tire that had to be replaced and on the eleventh lap a stop was made on the backstretch to replace a front right tire. The Chadwick, which was a factor throughout the first six laps, was reported to have stopped in the backstretch to adjust tires, but it was delayed principally by ignition troubles during that and the next lap.

Florida, in Locomobile No. 1, which finished fourth, changed a right front tire at the grand stand at the end of the third round. Both of the Knox cars, which were still running well when the race ended, stopped for tire changes. The 50-horse-

LYTLE TAKES ON GASOLINE

power machine driven by Denison changed one front and one rear tire on account of wear to insure against a blow-out, and the 40-horsepower Knox, driven by Bourque, made a change of the two rear tires at the end of the seventh lap, from the studded non-skids to plain tires after the roads had partially dried, in order to make a gain in speed. It also had some trouble with one of the front tires. At the Locust Grove repair station it stopped for water and also strapped a fresh tire on the rear deck, but made no change there.

Seymour, in Thomas No. 8, stopped at the repair station at Locust Grove on the backstretch to take on water and to put a new tire on the left rear wheel, although to all appearances the tire seemed to be all right. Possibly it was worn and weakened.

Chadwick Inspected

Immediately after its highly creditable showing in the Vanderbilt cup race last Saturday, the officials of the Chadwick Engineering Works arranged for a public inspection of the car. For this purpose the motor was dismantled in order that the dimensions and finish of the cylinders, as well as its other parts, could be examined. Through an unfortunate error, it was stated in the table printed in the issue of Motor Age of October 22, that the motor was rated at 90 horsepower. By the A. L. A. M. official rating, its cylinder dimensions of 5-inch bore by 6-inch stroke show it to be but 60 horsepower.

LUTTGEN SWINGS AROUND TURN AT JERICHO CORNERS, CROWD GIVING HIM WIDE BERTH

STATISTICAL HISTORY OF VANDERBILT CUP

GEORGE HEATH, 1904 WINNER

SUMMARY OF 1904 RACE

Total distance, 284.4 miles
Total laps, 10
Winner's average, 52.2 m.p.h.

Finish	Car	Driver	Time
1	Panhard	Heath	5:26:45
2	Clement	Clement	5:28:13
3	Pope-Toledo	Lytle	8 laps
4	Packard	Schmidt	8 laps
5	Mercedes	Campbell	8 laps
6	Panhard	Tart	7 laps
7	Mercedes	Luttgen	7 laps
8	DeDietrich	Gabriel	6 laps
9	S. & M. Simplex	Croker	6 laps
10	Pope-Toledo	Webb	5 laps
11	Mercedes	Hawley	3 laps
12	Panhard	Teste	2 laps
13	Renault	Bernin	1 lap
14	Mercedes	Werner	1 lap
15	Mercedes	Arents	1 lap
16	Royal	Tracy	1 lap
17	Fiat	Sartori	1 lap
18	Fiat	Wallace	1 lap

A. HEMERY, 1905 WINNER

SUMMARY OF 1905 RACE

Total distance, 283 miles
Total laps, 10
Winner's average, 61.49 m.p.h.

Finish	Car	Driver	Time
1	Darracq	Hemery	4:36:08
2	Panhard	Heath	4:39:40
3	Locomobile	Tracy	4:58:26
4	Fiat	Lancia	5:00:31
5	Renault	Szisz	9 laps
6	Fiat	Nazzaro	8 laps
7	Fiat	Sartori	8 laps
8	Mercedes	Warden	8 laps
9	DeDietrich	Duray	7 laps
10	Fiat	Chevrolet	6 laps
11	Mercedes	Keene	5 laps
12	Pope-Toledo	Dingley	5 laps
13	White	White	4 laps
14	Pope-Toledo	Lytle	4 laps
15	Mercedes	Jenatzy	3 laps
16	Darracq	Wagner	3 laps
17	Christie	Christie	3 laps
18	Fiat	Cedrino	2 laps
19	Mercedes	Campbell	1 lap
20	Mercedes	Basle	non-starter

SUMMARY OF 1906 RACE

Total distance, 297 miles
Total laps, 10
Winner's average, 65.11 m.p.h.

Finish	Car	Driver	Time
1	Darracq	Wagner	4:50:10
2	Fiat	Lancia	4:53:28
3	DeDietrich	Duray	4:53:44
4	Bayard	Clement	5:01:59 4-5
5	Mercedes	Jenatzy	5:04:38
6	Fiat	Nazzaro	9 laps
7	Itala	Cagno	9 laps
8	Thomas	LeBlon	9 laps
9	Panhard	Heath	8 laps
10	Locomobile	Tracy	8 laps
11	Mercedes	Luttgen	8 laps
12	Itala	Fabry	7 laps
13	Christie	Christie	7 laps
14	Haynes	Haynes	7 laps
15	Hotchkiss	Shepard	6 laps
16	Frayer-Miller	Lawwell	4 laps
17	Fiat	Wellschott	1 lap
18	Mercedes	Keene	non-starter

L. WAGNER, 1906 WINNER

SUMMARY OF 1908 RACE

Total distance, 258.06 miles
Total laps, 11
Winner's average, 64.3 m.p.h.

Finish	Car	Driver	Time.
1	Locomobile	Robertson	4:00:48 1-5
2	Isotta	Lytle	4:02:36 2-5
3	Locomobile	Florida	10 laps
4	Mercedes	Luttgen	10 laps
5	Thomas	Salzman	10 laps
6	Mercedes	Stricker	9 laps
7	Knox	Denison	9 laps
8	Thomas	Seymour	8 laps
9	Chadwick	Haupt	8 laps
10	Knox	Bourque	8 laps
11	Mercedes	Keene	4 laps
12	Matheson	Ryall	3 laps
13	Renault	Strang	3 laps
14	Hotchkiss	Klipatrick	2 laps
15	Acme	Patschke	1 lap
16	Matheson	Chevrolet	1 lap
17	Thomas	Gill	1 lap
18	Brasier	Pouget	non-starter

GEORGE ROBERTSON, 1908 WINNER

WOMAN DEMONSTRATES ELECTRIC'S UTILITY

PHILADELPHIA, PA., Oct. 27—That an electric vehicle of acknowledged low power may defeat a high-powered gasoline touring car in a race over a 10-mile course sounds strange, perhaps, yet such a contest took place a few days ago in Philadelphia and the electric carriage won by a margin of 10 minutes, or 1 minute to the mile. Incidentally, the rules of the contest were arranged on a common-sense basis to get information relative to the advantages of different types of self-propelled vehicles for special traffic conditions in congested cities, a matter which interests business men, professional men and women motorists who enjoy shopping tours and social calling trips with their cars. The contestants in the race at Philadelphia were both Studebaker cars, one being an electric runabout capable of doing about 17 miles an hour, and driven by Miss Laura Duval, an enthusiastic woman driver of both gasoline and electric vehicles. The other was a 40-horsepower touring car, a seating capacity of seven passengers, and driven by Tom Middleton, an expert thoroughly familiar with Philadelphia streets.

The challenge came from Miss Duval, who believed she could defeat any large and speedy touring car with her Studebaker electric, providing the route lay through the congested portion of a city, and that a sufficient number of stops were made. The rules of the contest required that the driver of each car make twenty-five calls in the shopping district; that the engine of the touring car be stopped each time; that the drivers must leave the car, enter the building, return to the car, and start for the next calling point. In the case of the gasoline car the engine, of course, had to be cranked, just as if the call had been one of an hour or so, the idea of the whole test being to show which of the two cars can be used with the lesser waste of energy to car and occupant.

The route selected was about such a one as a society woman would arrange for an afternoon's shopping, and stops were made at department stores, theaters, railroad stations, milliners', hairdressers' and candy stores. In order that the test might be made without a display of gallantry on the part of the driver of the big car, the list of twenty-five calling places was reversed, the two cars coming at all times from different directions, the last call for Miss Duval being the first for Middleton.

MISS LAURA DUVAL

filling was so slow as to have lost the race had it been as close between this car and the victor as it was between the Isotta and the Locomobile. Robertson had mediumly good facilities, but lost time filling the radiator from a common garden hose at the start of the second lap. Both of the Knox cars could have saved time by the use of long-leverage lifting jacks to raise the axle when making tire changes instead of using the common jack that the ordinary tourist carries in his kit.

The problem of wheelbase was not a determining factor in this year's race, as it was on the two occasions when the Darracq cars, piloted by Hemery and Wagner, carried off the trophy. Both of the Locomobiles measured 110 inches from axle to axle, the Isotta is 118, and has the distinction of being the longest wheelbase machine in the contest. All three Mercedes measured 107 inches; Haupt's Chadwick, 112 inches; the Knoxes 102 and 106 inches, respectively, and the Thomases 104 and 112. The banking of the turns is a factor which eliminates the wheelbase question to a considerable extent. Another factor is the cement roadway, on which cars of reasonable wheelbase can perform better than those that are very much abbreviated.

As much variety existed in the types of flywheel clutches employed, as in any other part of the car. The Locomobiles used the conventional cone type, as did Hotchkiss and Acme, the latter having cork inserts. All three Mercedes used Lindsay type; the two Knoxes and three Thomases were exponents of the three-plate disk type, and the Mathesons and Isotta of the multiple-disk type, Lytle's Isotta having in all fifty-one disks. An internal expanding type of clutch was used on the Renault. A commendable precaution in the form of a wire screen in front of the radiator was noticed on the Isotta and No. 3 Mercedes, the purport of this being to prevent injury to the radiator by stones thrown by other cars. In two or three foreign races cars have been put out of the running because of radiator injury from this cause, and the wire screen is a precaution that should be wisely followed by all entrants in big road races.

Because of the reasonable weight limit allowed in the contest, the wholesale drilling of frame parts and axles to reduce weight was not noticeable, except in one or two cases where particularly heavy cars had to reduce a good few hundred pounds. No. 4 Chadwick had the rear axle drilled throughout its entire length, but, in spite of this, had a good safety factor by reason of the original axle size. This car used a peculiar type of front semi-elliptic spring, in which the leaf which bolted to the spring hanger at the front end, extended but half way the length of the spring and bolted to a projection on the top of the spring shackle, giving an extra leaf in the front half of the spring, and one double in thickness for the remaining leaves. In conjunction with this shock absorbers were used only in front. The majority of makers used shock absorbers in front and rear, and it was apparent that the Hartfords had by far the biggest following, the Renault car, however, being fitted with absorbers built at the home factory.

ELECTRIC AND GASOLINE CAR IN UNIQUE "RACE"

MISHAPS OF THE CUP CARS

(Continued from page 13.)

the No. 5 Mercedes, which required several minutes to replenish its gasoline supply. The common small-necked 5-gallon gasoline can was used, and the mechanic was compelled to punch holes in the bottom of the can in order to get a little quicker action, but with this done the

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Robertson-Locomobile Victory Epoch Making

AT last, after three unsuccessful attempts, an American car has won the coveted Vanderbilt cup trophy, and the premier honors of road racing in America are held by the Locomobile car, so skillfully piloted in its 258-mile flight by George Robertson, who had been looked upon by many enthusiasts as too reckless for a road driver, but to whom all America owes the honor of first establishing an American victory over foreign cars. This newly won Locomobile honor is an American honor; every loyal citizen is proud of the fact that at last an American car has triumphed over one of the best European constructions; jealousy has taken a back seat in rival American factories; and for once America is a unit in lauding the Robertson-Locomobile performance. During the last 2 or 3 years several of the American makers have almost despaired of ever winning a road race on Long Island against specially-built European racing machines. During three consecutive seasons the American product went down to defeat on Long Island, each time at the hands of a French car, not the most powerful in the contest but one specially suited to racing conditions as encountered on the Island. While these three defeats crushed the fondest hopes of victory out of the few manufacturers, thanks to the indomitable perseverance of others, there were still ready a few who were prepared to stake everything against the best the foreigner could put up, and what citizn would be so unpatriotic as to refrain from the "hurrahs" that greeted the American winner.

Energy Needed To Win

SEVERAL American makers have been unreal and unsportsmanlike in their attitude towards road racing and the Vanderbilt cup. They have wanted to win the trophy the first time they contended for it; they have wanted to win it if possible without contending against the best foreign drivers, and they have wanted to win it without the requiste amount of care and preparedness in the manufacture of the contesting car. Lukewarm and half-hearted efforts of this nature never have and never will succeed. It takes effort and money and time to win a Vanderbilt cup race, all of which it is safe to assert the victorious company this year has expended, and which other companies must expend before they can count a road race trophy of this importance among their laurels.

Fourteen Makers Have Tried

WHILE many American makers have been half-hearted in their road racing efforts, others have not. In the four Vanderbilt cup races there have been in all seventy-one starters, twenty-six of which, or 36.6 per cent, were American machines. Many of the twenty-six starters were not specially-built machines. In the 1904 race four of the five American contestant were stock cars; in the 1905 race, one was a stock machine of the five entrants, and in the 1906 race one out of the five starters was stock, so that in reality but twenty specially-built American cars have in four attempts contested for the trophy. Compared with the number of French entries in French road races, with the number of Italian entries in Italian road races, and with the number of German entries in German road races, this number is particularly small, but, of course, does not represent the entire American effort, because, in previous Vanderbilts, the eliminating races reduced the number of contestants to the maximum five. These twenty-six entries represent fourteen different makes of cars, three of which, Locomobile, Thomas and Pope-Toledo, have been represented by four cars each.

THE 1908 Vanderbilt will go down in history as a true-American Vanderbilt, in that the drivers of the first three cars were American citizens, while the first and third cars to finish were American machines. It is meet that America should win this year, insomuch as 1908 has been an epoch-marking period in road racing in this country. From the two "curtain raisers" at Savannah last March until the present time, America has witnessed eight road races, and the two billed for Savannah next month will complete a total of ten—a truly remarkable record for the first year in which a road race has even been attempted other than the Vanderbilt. Ten races in a season means that America will soon have a squad of efficient drivers; drivers who will not be afraid to meet the best that Europe can bring across the ocean. Ten road races a year means that American makers will soon have mastered—some of them have already—the art and science of racing car construction to a degree of perfection equal to that accomplished abroad; and ten road races a year will soon place America so that she will be able to win.

Rules Reduced Entries

UNFORTUNATELY there was no race in 1907 owing to the inability to secure a properly guarded course, in the vicinity of New York. The problem arises how can such a course be obtained unless an iron fence, spike-topped, is stretched around it. It is now an admitted fact that the 1908 rules, at variance with the international regulations, proved detrimental in assembling a more international entry. At the same time, though, the French grand prix cars had lesser bore, their makers had retained as much horsepower as before by the simple expedient of lengthening the stroke, for there was no maximum weight restrictions. If the big club in New York city had not in the struggle for the retention of its "foreign relations" forced the European clubs to observe scrupulously the Ostend agreement, it is a certainty that the bore difference would not have kept the grand prix cars out of this year's Vanderbilt. However, that is an old story, the sequel of which is scheduled for Savannah. The American winner went up against three Germans and two French unlimited bore and stroke and trounced them a-plenty. And right here it should be said that the single Italian participant, with its lesser bore and stroke, made a consistent showing, for which it should receive a goodly amount of credit, though it should be mentioned in the same breath that an American driver was at its wheel. The intractible American crowd surging upon the course as soon as the American-Italian duel had terminated prevented other cars from finishing, though it is good figuring that a Locomobile was entitled to third place in front of a Mercedes, behind which came another American, a Thomas.

Courses Must be Cleared

AMERICA has one lesson to learn in road racing, or, at least, some of the promoting organizations have; that is, the course must be kept clear until at least five of the leading cars have had an opportunity to complete the course. Saturday's fiasco, after the two leading cars had completed, was a blotch on American motor sport, when the grandstand crowds were permitted to overrun the course to their own danger. There were soldiers enough on hand to have prevented this, but they were apparently as much interested in the race as were the spectators, and acted accordingly. When contestants pay their entry money, build their cars, and prepare for the fray, it is their right to have a properly guarded course.

PLANS FOR NEXT PRINCE HENRY TOUR MADE

VIENNA, Oct. 17—The members of the committee of the Austrian Automobile Club, which has charge of the arrangements in this country for the Prince Henry tour of 1909, held a meeting at the local club house at which delegates from the German Automobile Club and from the Bavarian Automobile Club were present. It was decided that the start shall be made from Berlin, the contestants to reach Breslau the same day. On the second day the run will be from Breslau to Brunn, and the next day from Brunn to Budapest, thence to Vienna, from Vienna to Salzburg, and on the sixth and last day from Salzburg to Munich. There will be no hill-climbing trials. Instead, two speed trials will be held, the first one at the beginning of the run and the second at the end. The distance probably will be the same for both tests. Prince Henry made it known that he wishes the rules made as strict as possible in order to prevent any but regularly constructed touring cars entering. It was decided to make new rules that will prevent anything like a racing car or one of a special construction being used. It is likely that with that end in view there will be imposed a minimum weight for bodies and also for the chassis. In Berlin, Budapest, Vienna and Munich festivities will be organized in honor of the tourists, and it is possible that in the Hungarian and Austrian capitals the visitors will stay over a day or so.

Foreign Trade Tips

Washington, D. C., Oct. 24—Official advices are to the effect that there is an opening for enlarged sales of motor cars in the Transvaal. The use of motor cars in the Transvaal is practically restricted to the two large towns and surrounding districts of Pretoria and Johannesburg, these cities containing 25,000 and 84,000 whites, respectively. There are about 800 cars in use in Johannesburg, a few of which are of American make. The principal demand is for a car of from 10 to 18 horsepower and ranging in price from $1,250 to $1,750. Pretoria and Johannesburg have a number of dealers who also operate fine garages. About 3½ years ago Yucatan, or rather Merida, the capital af Yucatan, offered a splendid field for the sale of American cars. There were then 200 licensed machines in operation in that city. In Progreso and the inland towns motor cars have never been used to any appreciable extent, because the people generally are not well to do. Although Merida is probably one of the best paved cities in Mexico, the roads in the other sections of the state are still unsuitable for motor cars. The business crisis through which Yucatan is still passing cannot, perhaps, be more graphically illustrated than by the enormous decrease in the use of motor cars. Today the tax records show that the number of cars now in commission does not exceed thirty-five, as against 200 3 years ago. The cars have either been shipped away or are on storage awaiting the return of better times. The American car predominates in Yucatan and has given very satisfactory results. The cost per month for maintaining an ordinary touring car, including garage, fuel, oil, repairs and municipal taxes, amounts to about $90 gold.

Rules Regarding Body Construction Will Be Rigid—Foreign Trade Tips—Good Roads News

Sounds Sentiment of Farmers

Milwaukee, Wis., Oct. 26—A. R. Hirst, highway engineer of the Wisconsin geological survey, in charge of the construction of the 5-mile model road from Milwaukee westward, is one of the original good roads boosters in Wisconsin, and in his 11,000 miles of travel through Wisconsin during the last 6 months he has sounded sentiment thoroughly.

"The greatest obstacle with which we have to contend," said Mr. Hirst, "is the feeling among the country folk in sparsely settled parts, where good roads are the most desirable, that there is a 'nigger in the woodpile' behind the proposed amendment to the state constitution providing for state aid for highway improvement, which amendment is to be voted on in November. This colored gentlemen in the fuel is none other than the motorist.

"We are suceeding very well in our attempts to dispel the notion, with the assistance of the motor clubs and the parent body, the Wisconsin State A. A. Farmers in these outlying districts, who have seen perhaps one car in their lifetime, say they are heartily in favor of the good roads amendment, but they fear that no sooner have they built up their highways than the roads will be usurped by the motorists. I have had to tell them that the motor car has come to stay and it is a condition that has to be met, to pacify them. Then they finally see the error of their ways and give the project their hearty support.

"It is a time when we need the aid of every motorist to further the plan. They are coming to our aid in good shape. They show every courtesy to the farmers, plead with them, and I believe before long there will not be many agriculturists who will vote 'No' on the amendment. The clubs have helped us greatly in our campaign of education, and we are grateful. The bicycle was highly unpopular some 15 years ago. It is now and has been for some years a utility. It is the same with the motor cars. Farmers are beginning to realize their worth and are buying them in large numbers."

Maryland Plans a Tax

Baltimore, Md., Oct. 24—The Maryland motor car commission has prepared in the rough a bill taxing motor cars, whereby the state will receive $75,000 a year for good roads. The commission figures on motor cars being taxed from $10 to $25 a year, according to horsepower. Two thousand high power machines, such as would pay $25 a year, would at once provide $50,000 of the amount, and as there are now 5,500 cars in the state the remaining $25,000 could easily be made up of the combined taxes on the lighter and smaller machines. In time, the application of this amount to the creation and maintenance of good roads would greatly increase the use of motor cars, and within a few years there would be from 20,000 to 25,000 motor cars speeding along the state highways, all contributing their taxes toward the extension of good roads. At present the tax on motor cars is only $3 and the license is perpetual. The commission also intends to include in its bill a liberal but not reckless speed law and the licensing of chauffeurs.

Cars in Use in London

London, October 18—According to the records of the London county council up to and including June 30, there were 23,838 motor cars and 8,883 motor cycles in use in London on that date. Of the 23,838 cars there were 1,927 trucks, delivery wagons and lorries. From May 1 to June 30 the officers of the county council issued licenses for 1,797 pleasure motor cars, fifty-seven commercial vehicles and 330 motor cycles.

Coming Motor Events

Brazier Cup Event—Sixth annual contest for Brazier cup under auspices of Automobile Club of Philadelphia, October 31.

Three-Day Test—Detroit Automobile Dealers' Association's 3-day endurance test, November 5, 6, 7.

Light Car Race—Light car race at Savannah under Automobile Club of America's auspices, November 25.

Grand Prize Race—Automobile Club of America's grand prize race at Savannah, Ga., November 26.

Paris Salon—Annual French motor car show, November 28-December 18.

French Show—Eleventh annual Paris salon, November 28-December 13.

Palace Show—Ninth international show, conducted by the American Motor Car Manufacturers' Association with the Importers' Automobile Salon and the Motor and Accessory Manufacturers, Grand Central palace, New York, December 31 to January 7.

Garden Show—Ninth annual show of Association of Licensed Automobile Manufacturers, Madison Square garden, New York, January 16-23.

Philadelphia Show—Annual show at Philadelphia, January 23-30.

Cuban Road Race—Cuban Automobile Association's road race, February 1.

Chicago Show—Annual N. A. A. M. show in Chicago, February 6-13.

Hartford Show—Hartford Automobile Dealers' Association's annual show at Hartford, Conn., February 27-March 6.

MOTOR CAR DEVELOPMENT

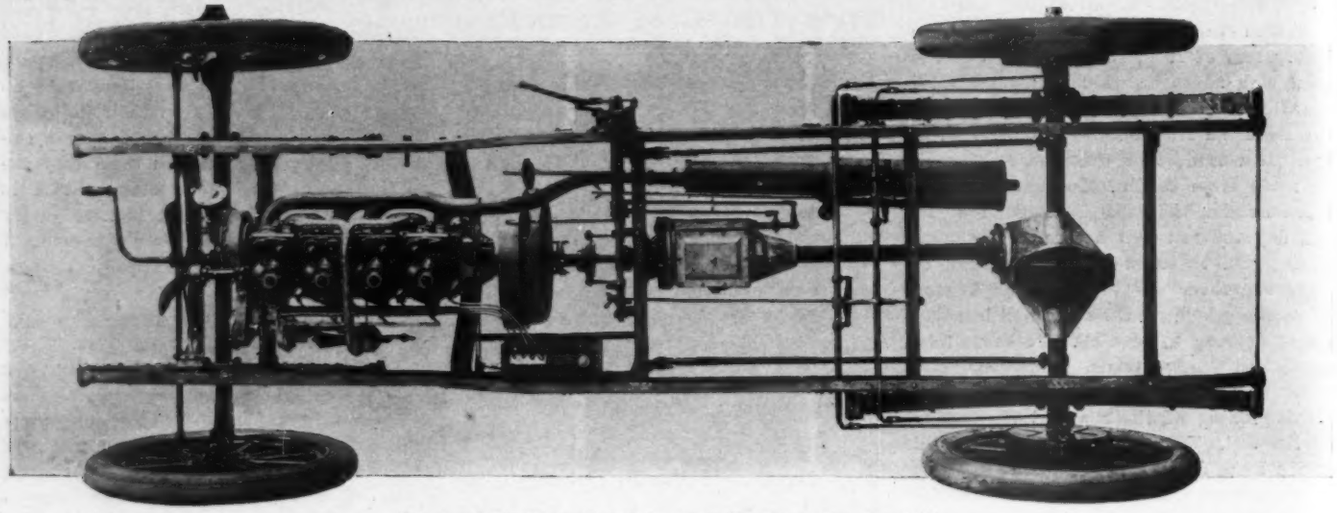


FIG. 1—CHASSIS OF RAMBLER FOUR-CYLINDER CAR FOR 1909

THOMAS B. JEFFERY & CO., Kenosha, Wis., will market for next year two types of cars, four-cylinder and two-cylinder models, the four-cylinders in two motor sizes, the two-cylinder in two models but one chassis type. In the four-cylinder models the general scheme of design remains unaltered but improvements are noted in the oiling, ignition, cooling, clutch, transmission, brakes, and other parts, all of these changes being simplifications which are resultant upon the experiences of the present year.

The two four-cylinder models, known respectively as models 44 and 45, are of the same design throughout, but differ in size. Model 44 is a 34-horsepower, four-cylinder type, with cylinders 4½ inches square, and a five-passenger body. Model 45 is a 45-horsepower, four-cylinder machine with cylinders having 5-inch bore, 5½-inch stroke and seven-passenger body. The following description applies equally to each of these models: The motor agrees with the 1908 type in the employment of a one-piece crankcase, in which the crankshaft and assembled bearings are inserted from the rear end, and having on the right a very large inspection plate 23 inches long and 8 inches deep, being of sufficient size to afford access to the main bearings of the shaft and the connecting rod. The motor support is a three-point one, with two points at the front end through a transverse steel tubing which rests in brackets on the side member of the frame, and one point at the rear on a dropped cross member of the frame. The half-time gears are enclosed in a separate compartment in front of the motor-supporting tube. The use of individually cast cylinders with valves on the right side is continued, but the openings for the valves are somewhat higher so that the exhaust manifold is higher up from the valve springs than at present. Of primary importance is the offset crankshaft, which is located 1⅛ inch to the left of the vertical center line of the cylinders, the result of this offset being a greater flexibility of the motor, which it is claimed will drive the car 3½ miles an hour on high gear. With this offset it is also possible to add 26 pounds to the weight of the flywheel rim. The company claims that this results in 10 pounds per square inch piston area being delivered to the crankshaft in addition to that normally received with a centered crankshaft. The camshaft gear has been doubled in width. The driving pinion on the crankshaft is rawhide with the result that noise is considerably eliminated.

In the ignition department attention is called to the raising of the timer, which is located at a 45-degree angle in front of the half-time gear. The raising has been done in the cause of accessibility. A particularly novel spark plug terminal is used. The high-tension wire A, Fig. 3, from the coil to each plug ends in a fiber block B, which is retained in a bracket C, clamped to the return water pipe D, a thumb screw E locking the bracket in any desired position. On the under side of the fiber block is a metal strip F which bears upon the top of the spark plug. With this terminal system, should missing occur due to sooting at the spark plug point, raising of the fiber block will give the same results as spark gap. Should the spark plug have to be removed, the fiber block is swung high out of position, affording every access to the plug. When the magneto is desired the Bosch high-tension type is furnished, which, in conjunction with the battery, gives a complete double system.

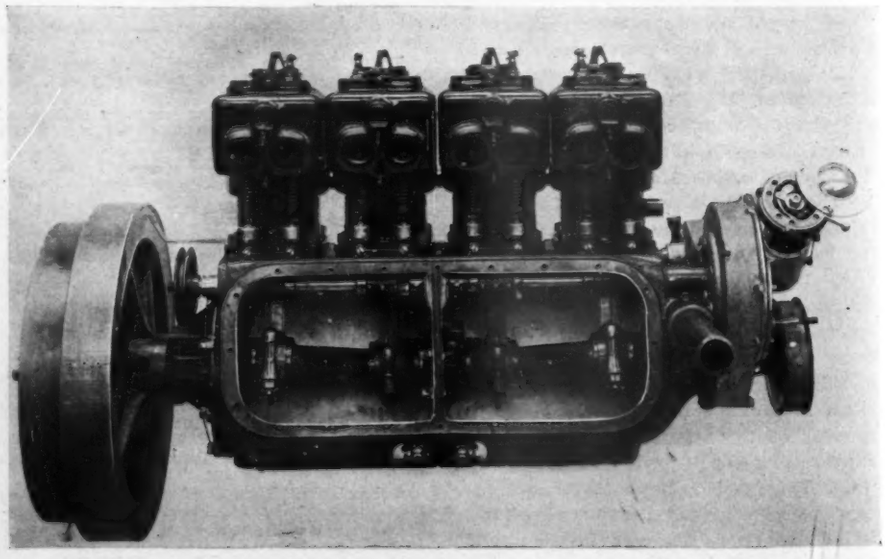


FIG. 2—VALVE SIDE OF RAMBLER FOUR-CYLINDER MOTOR

RAMBLER FOUR-CYLINDER CARS

FIG. 3—RAMBLER WIRE CONNECTION

When installed it is located on a special bed-piece on the left side and is driven through a continuation of the pump shaft, the usual jaw coupling in this shaft being in place. The timer is of the roller contact type and, as shown in Fig. 4, the wires attach at the underside to stationary binding posts and in varying the timing the ring R, carrying contacts in touch with the binding posts is shifted, each contact in this ring being long enough circumferentially to make contact with the binding post in the maximum advance or retard. This design leaves the high-tension wires stationary when charging the spark.

As in 1908, the mechanical lubricator is carried at the left rear of the 1909 engine and under the slanting toe-board of the car, the drive being through a wire belt from a pulley on the rear end of the camshaft. The pump location is somewhat altered, however, in that it is located longitudinally, close to the side member of the frame and slightly further to the rear than at present. This year the oiler is carried crosswise in line with the flywheel and supported on brackets; the new location places it further from the flywheel, renders it more accessible, and, in conjunction with these, its capacity has been increased 50 per cent. It is placed in an oil tray which takes care of any slop over; and flying oil from the flywheel and clutch, is looked after by an oil guard on the flywheel. Access to the oiler is through an automatic locking door in the aluminum toe-board.

A change in the cooling system is that the water pump W, Fig. 5, is now located in rear of the transverse tubular support for the front end of the motor, and is entirely detached from the half-time gear housing with which it was partly incorporated this year. With this new location it is impossible for water to enter the half-time gearing housing should a leak occur in the pump. The piping to the water jackets is particularly neat, being a straight tubing W1, hugging the water-jackets at the left and coupling with an integral pipe arm W2 from the pump housing. From the base of the radiator to the pump is also a short distance, in which a straight length of hose does duty. The radiator fan is supported from the forward cylinder.

A simple form of compression relief cock is furnished, consisting of check valve held closed by a spring and the compression within the cylinders, so that the greater the pressure against the valve the

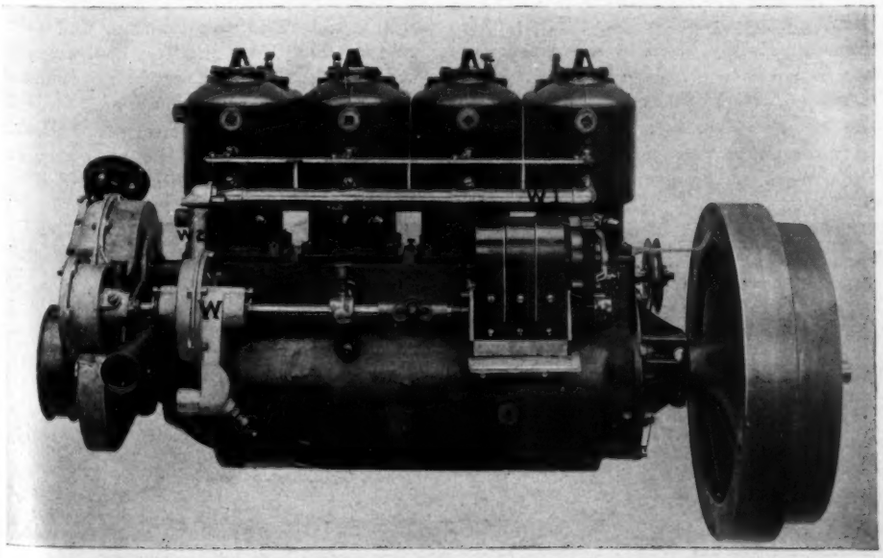


FIG. 5—NEW WATER PUMP LOCATION

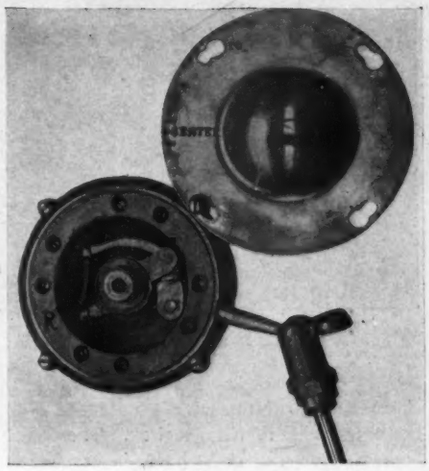


FIG. 4—RAMBLER TIMER

tighter it will hold. The handles operating the four reliefs connect with a single arm which may be operated from the dash.

The foremost improvement in the transmission system shows the discontinuing of the balanced type of inverted cone clutch heretofore used by the company in its four-cylinders cars, and the adoption of a straight direct-thrust cone type in which the cone is a pressed steel member with a friction surface 50 per cent greater than that previously used. The clutch cone is leather-faced and beneath the leather are spiral springs carried in radial sockets in the cone, which springs press outward on the leather giving gradual engagement. A particularly simple manner of varying the tension of the clutch spring is used, which is accomplished by adjusting three easily accessible nuts N, Fig. 6, which are as studs which extend from the flywheel through the collar against which the rear end of the clutch spring bears. The nuts can be adjusted with a common wrench. To facilitate gear-changing a camel's hair block is placed in the bearing for releasing the clutch, so that the friction of this block acts as a brake to stop the spinning of the clutch. Regularly the clutch is pedal-released, in which the throw of the pedal is 50 per cent shorter than this year; it can, however, also be released by the emergency brake lever, the interconnection with which is such that the first 2 inches of lever movement disengages it. The adjustment of the brake lever is such that the clutch can be disengaged and held so without the brake being applied, while the further movement of the lever will give the desired braking effect.

The combined transmission, propellor-shaft, and rear axle construction used this year, and which constitute a unit, is continued. The gearset is a selective design with the usual three forward and reverse

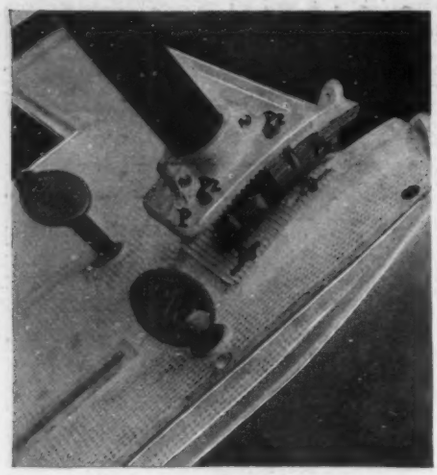


FIG. 6—TILTING STEERING COLUMN

speed variations, and the gearbox is a tubular construction with a front end plate the entire size of the gearbox. The countershaft, like the mainshaft, is carried on roller bearings but occupies the base of the case, being directly beneath the mainshaft. The support of the gearbox is through a flange on the forward plate, this flange having a trunnion support on a cross member of the car frame. The driveshaft from the gearset to the rear axle is carried in a heavy tubing which is secured into the gear end of the gearbox by casting the latter around it. An improvement in conjunction with the gearset is that the two shifter rods are now carried in a boss in the side of the case, one being in the form of a rod and the other a surrounding sleeve. On the rear ends of each is a short arm with ball ending with which the shifter mechanism attaches. This year it will be remembered a rocker arm attaches to each of the shifter rods at the rear of the gearbox. The new arrangement is much simpler and more positive. The reverse position of the change-speed lever is located directly back of that of low-speed, and access thereto is by pressing a small button in the floor board of the car. The change speed lever is normally prevented from entering the reverse condition by a bell crank extending downward from the lower operating sector gear. In order to prevent leakage of grease from the gearbox, a stuffing box is placed on the propellorshaft, immediately back of the rear bearings, and a similar stuffing box around the large front bearing in the housing. Other stuffing boxes are located in the rear axle shaft to prevent the escape of lubricant from the differential. The rear axle is a semi-floating construction in that the differential gears are integral with the ends of the axle drive shafts preventing the withdrawal of the shafts through the wheel hubs, but all of the car weight is carried on the axle housing as in a full-floating type.

In the running gear of the car several improvements are noted: The brakes, although of the same size as this year—13-inch drums and 2½-inch bands—are improved in that there is greater leverage, due to a change in the position of the brake shoe and the lever which operates it; with the brakes disengaged, the brake levers stand at an angle of 45 degrees to the brake rods, and when the brakes are applied this angle is changed to 90 degrees, being the angle of greatest leverage. This change has been accomplished by hollowing ou tthe brackets to allow the brake levers occupying a more backward position when at rest. The brake adjustment is very simple: The brake connecting rods are adjusted by shortening the rods at the forward end where these rods are threaded and pass through arms on the brake lever cross-shaft. On the front ends of these arms are large wing nuts X, Fig. 7, which are adjustable by hand. The location of these wing nuts beneath the foot board permits of brake adjustment on the road without stopping the car.

Another running-gear improvement is the tilting steering column, in which the column can be set in any desired position to suit the operator, and securely locked. This is accomplished by clamping the column in an aluminum plate P, Fig. 6, the under side of which is serrated. In the aluminum toe-board is a slot P1 for the steering column, and on either side of the slot the toe-board is arched with the surface serrated to correspond with the under surface of the plate on the column. Two studs P2 rigidly fitted in the upper plate are designed to operate in slots P3 in the toe-board, and by nut and lock-nut anchor the column as desired. The steering gear is of the nut and screw principle, now used for 6 years by the company, but the parts

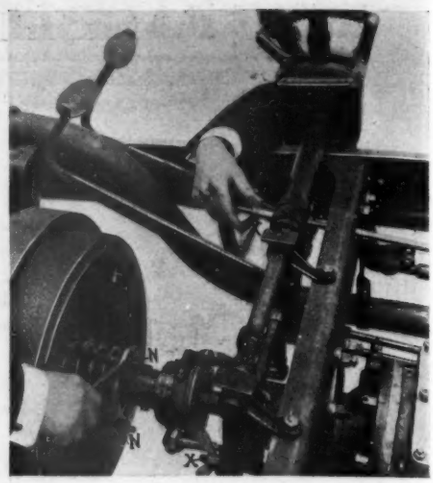


FIG. 7—CLUTCH AND BRAKE ADJUSTMENT

are heavier than heretofore. Downward thrust is cared for by a ball thrust bearing located at the top of the steering column; wear in the screw and nut may be taken up by a hard bronze nut, and the steering-arm is carried well out to the car frame so that the rod connecting with the steering knuckle does not interfere with the mud apron and works practically parallel with the car frame.

The company has adopted as standard triple-action semi-elliptic springs, which are made unusually long and with a coil at the rear end. In these springs the long leaf at the rear curves semi-circularly and attaches to the bottom of the auxiliary coil and the third longest leaf couples to a supplementary shackle which hinges to the top of the regular shackle. These springs have a short top leaf and the usual graduation of lower leaves. The bearings used in the floating rear axle are ball and rollers, and balls are used in the front axle. The driving action of the rear axle is through side radius rods from the axle housing to the side members of the frame. In both models straight line body design is used. The tonneau doors are fitted with a special Jeffery lock, a detachable toe-rail is placed in the tonneau, and other features are in place. The bodies are of the straight line type, with large tonneau, rear fenders set into body and straight dashes. The bonnets are secured by leather straps, front fenders are of a racy design, and running boards short.

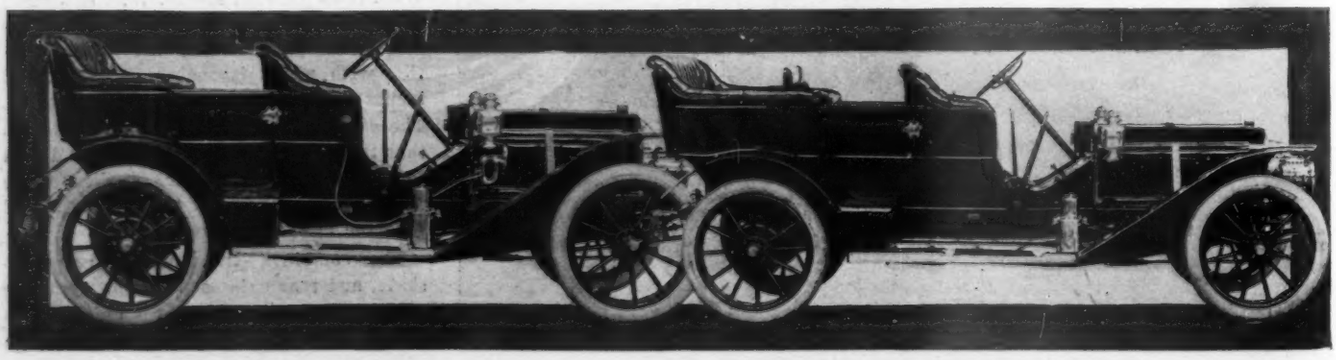
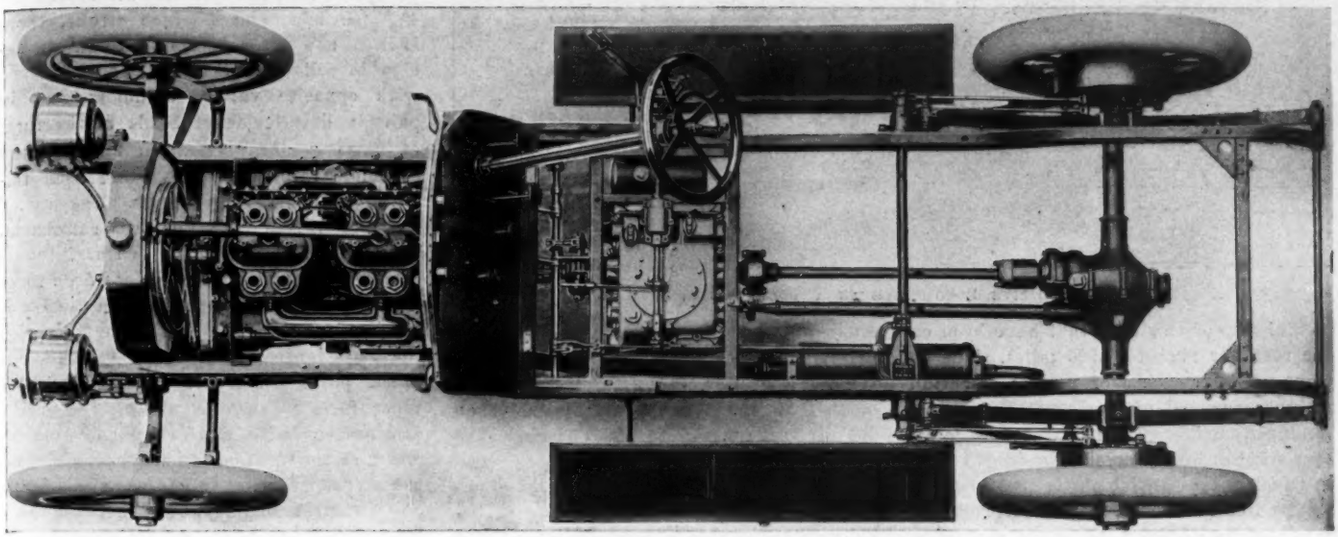


FIG. 8—TWO BODY STYLES USED ON 1909 RAMBLER FOUR-CYLINDER CARS

LOCOMOBILE BUILDS SHAFT-DRIVE CAR

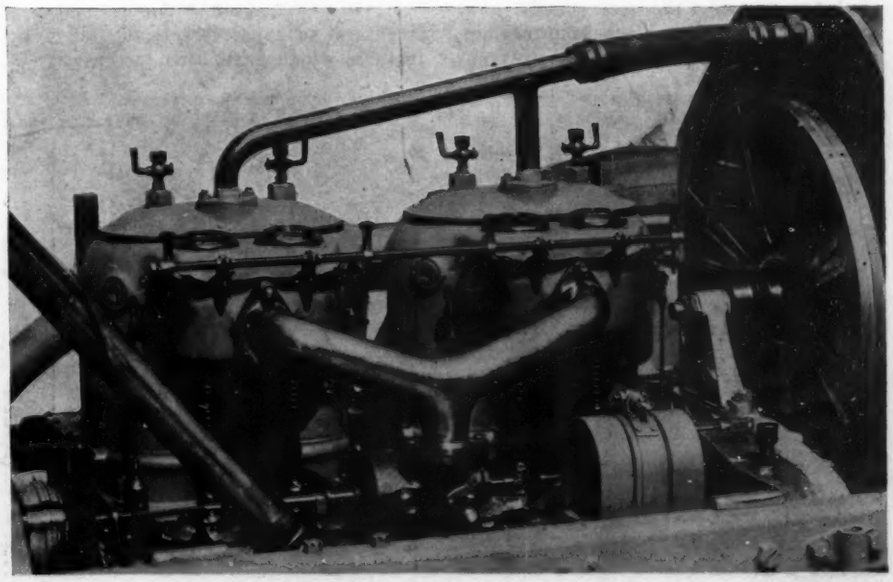


CHASSIS OF LOCOMOBILE'S FIRST SHAFT-DRIVEN MODEL

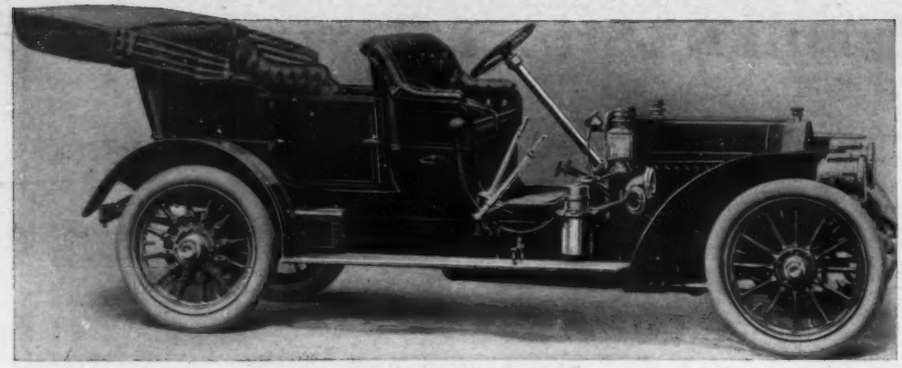
MOST important in the announcement for next year of the Locomobile Co. of America, of Bridgeport, Conn., is the small shaft-driven car, rated at 30 horsepower, and labeled model L. In addition to this car the company continues its 40-horsepower machine which is practically the same as at present, except for a few minor details. In the shaft-driven model, which is the first of its kind marketed by the company, nothing out of the ordinary appears in general design, but several combinations exist by means of which Designer Riker has aimed to incorporate as many as possible of the features of a chain-driven car. Although the announcement of a shaft-driven model comes as a surprise to many motorists, in view of the fact that this company has heretofore been a staunch supporter of chain-drive, it is not the least important to know that work has been in progress on this model for 3 years, during which time continuous investigations on the relative merits of various shaft-drive constructions have been made. This axle is of the floating type in that none of the weight is carried on the driveshaft halves, but solely on the housing. This housing consists of a two-part expansion in the center for carrying the differential, and two axle tubes which are seated in this housing by hydraulic pressure after which they are riveted in place. The housing thus formed is assisted by a strut rod fitted with a ball seat head forged integrally with the rods. It has a turnbuckle for adjustment. Before dismissing the housing part, it is well to note that the axle tubes are of alloy steel and that no brazing whatever enters into the make-up of this axle. The use of hydraulic pressure and riveting is to avoid any possible loosening of parts.

In order to remove torsional strain from the rear axle tubing, distance or strut rods, similar to those used on chain-driven cars, connect between the ends of the axle tube and the side members of the frame, their duty being to retain the rear axle parallel with the front axle. These rods at their rear ends are free to turn on the axle tubes and carry the brake band supports. Having these rods revoluble on the axle housing allows of an independent vertical movement of the axle and carrying the brake shoes on them insures all braking strain being removed from the springs and the axle housing. In addition to this, the springs are mounted on revoluble seatings and are shackled at both ends, the double shackling being permissible because of the distance rod construction. Torsional strain is absorbed by a torsion rod carried rigidly in the differential housing at the rear and supported at the forward end from a cross member of the frame through a spring suspension. Starting the car in either direction results in a compression of the springs which absorbs the torque reactions and reduces the tendency of the body to rise with the car starting. In the axle tubes special care has been taken to obviate any shoulder and sudden changes from one diameter to another, such variations being made up by gradual tapers.

So much for the stationary part of the axle: The driving portion also shows careful construction. Starting from the transmission drop forgings enter almost entirely into the make-up of the shaft drive, and are also a prominent feature of the differential and rear axle. The forward universal consists of two drop-forged yokes, the pins of which are bronze-bushed, while the latter are clamped with steel rings in order to permit of taking up any wear that may occur, although the experi-



IGNITION SIDE OF 1909 LOCOMOBILE MOTOR



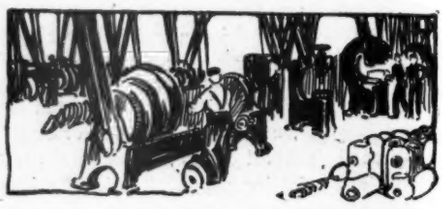
SHAFT-DRIVE LOCOMOBILE AS A TOURING CAR

mental cars of this type that have been on the road for almost 10,000 miles, show no signs of wear whatever in this essential. At the rear end of the shaft there is a combined universal and telescope joint, consisting of an extended drop-forged yoke in which a substantial pin is free to move longitudinally on rollers, the latter being hardened and ground, as is the case with all load-carrying parts. This yoke of the universal joint is in one piece, with the shaft carrying the driving bevel, and is supported on an annular ball-bearing besides carrying a special thrust bearing of the ball type, which is placed directly behind the universal. There are several features of interest in connection with the use of the annular ball-bearings on the Locomobile, a great deal of care having been taken to mount them exactly in accordance with the maker's specifications. For instance, the races of the forward bearings in the gear-set are rigidly held, while the after one is allowed to float, thus permitting the bearing to center itself accurately. This is also true of the ball-bearings used on the drivingshaft of the live axle. All are of unusually large sizes for the loads to be carried, providing a very high factor of safety where these important essentials are concerned. A ball thrust bearing is placed on each side of the differential and annular ball-bearings are used for carrying the rear wheels. The drivingshafts are one-piece drop-forgings, and are made integral, with heavy flanges on their outer ends from which the wheel-driving clutches are milled, the specifications of the later calling for their engagement with the corresponding member on the driving wheel to .0001 inch. The standard gear ratio is 3.24 to 1.

The brakes measure 14 inches in diameter by 1½-inch face, and, instead of being mounted concentrically, are placed side by side in a large drum housed in by a plate carried on the distance rod. Small yoke equalizers are employed on both the emergency and running brakes, thus dispensing with cables. The brakes are cam-operated, the shafts being concentric, and are lubricated by a compression grease cup, as is the case with every other moving part of the car outside of the motor and gear-set, no fewer than twenty-eight of these cups being provided on such parts as the spring shackles, steering knuckles and the like. Further evidences of the painstaking care used to provide proper lubrication is to be found in the fact that the spring leaves are all graphited before assembling. The rear springs measure 48 inches by 1¾ inches, while the forward ones are 36 inches long, of the same width. In drop-forging the saddles for the former, an extension has been placed on them to provide a lifting point for the jack—an addition that has been found very convenient.

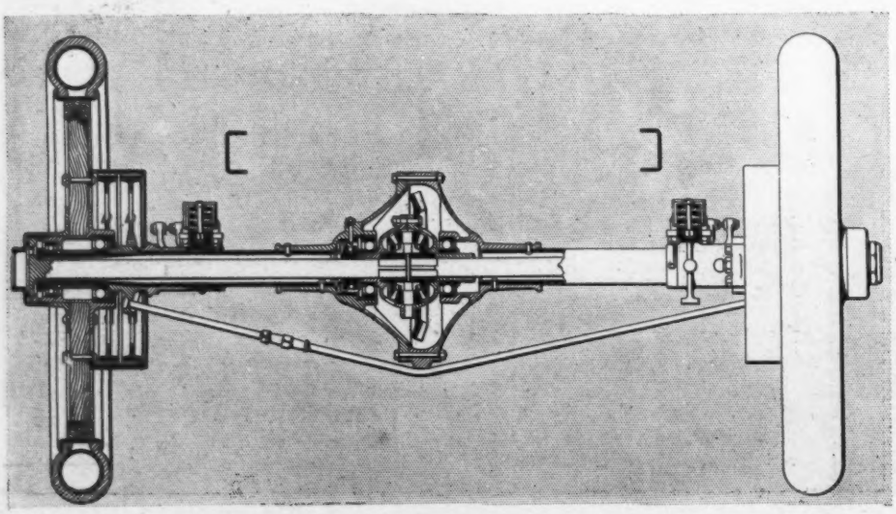
In the power plant of this new model, it is natural to expect practically all of the features which have been incorporated in Locomobile cars for the last number of years, and as a matter of fact, with the exception that the cylinders are made with 4½-inch bore and 4½-inch stroke, there is little new in connection with it. In design it follows that conventional T type with opposite valves, cylinders cast in pairs, and waterjacket heads in the form of large bronze plates. In finishing the cylinders three boring cuts are used followed by a grinding process. The use of opposite valves calls for two camshafts, both of which are made with integral cams, being cut from a one-piece drop forging and completely turned out in the Locomobile factory. The intake shaft carries the four igniter cams for the make-and-break parts which are designed with a taper face, so that by sliding the entire camshaft endwise, any desired advance or retard of the ignition is accomplished. The use of drop forging in car parts is an old one with this company, and wherever forgings of this nature are used a careful heat treatment is given to the different parts. The range of parts covered by this process of construction is wide and extends from the smallest fitting to the one-piece I-beam axle.

As has been the case for a number of years past, manganese bronze is still re-



tained as material for the crankcase, the supporting arms for the motor being cast integral. The oil-pan is of aluminum, as is also the housing for the timing gears, neither of these members being called upon to sustain any load. Throughout the construction of the motor the most advanced practice is followed to insure accuracy and interchangeability, the cylinder, pistons, rings, crankshaft and camshaft all being ground to micrometer gauge, while such pieces as the crankshaft are all specially heat-treated, the Locomobile plant having a particularly elaborate and complete heat-treating and hardening department.

As has come to be recognized as the best standard practice in this respect, the oiling equipment of the motor has been made practically integral with the latter on the new model L. A mechanical force-feed oiler, having three direct leads to the main bearings, is situated at the rear of the motor, almost under the footboard, and is gear-driven from that end of the exhaust camshaft, the drive all being protected by an aluminum oil-tight housing. To facilitate the distribution of the oil, the crankshaft is drilled, while a hand pump on the dash is employed to supplement the crankcase supply for splash lubrication whenever necessary. But one of the old feeds is carried through a neat

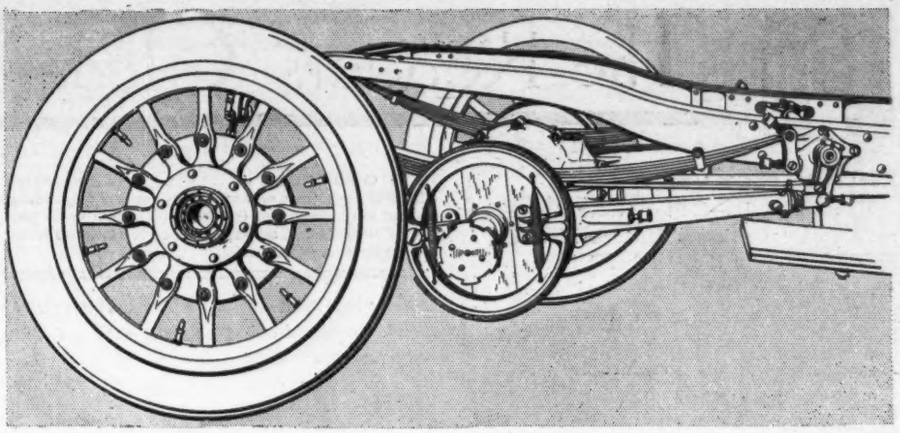


REAR AXLE LOCOMOBILE SHAFT-DRIVE CAR

and very small sight glass on the dash, thus ridding the latter of what has long been regarded as an undesirable encumbrance.

The carbureter is of a special type that has been developed by the designers of the Locomobile during the past 5 or 6 years, and which for the coming season has undergone one or two changes. Chief among these is the adoption of waterjacketing, hot water being tapped from the top of the jacket of the rear twin-cylinder casting, and led between the latter and the forward pair to the carbureter jacket, the discharge from this being returned to the bottom of the radiator. Liberal sized copper tubing has been adopted for this purpose, and no flexible joints have been found necessary. Shut-off cocks are provided both on the intake and outlet to provide for regulation of the hot-water flow. Another entirely new feature of this carbureter is the conical tapered spring auxiliary air valve. This spring is carefully wound to a very closely predetermined tension, and is vertically placed directly above the throttle, which is of the piston type. Any increase in suction above that normally taken care of by the main air inlet causes this spring to distend, thus permitting additional air to

enter through the spaces between its coils. The piston throttle in question is controlled from one end by the usual hand lever on the steering wheel, while from the other it is regulated by a centrifugal governor incorporated in the exhaust camshaft-driven gear. This governor permits the motor to maintain any speed up to the point of throttle opening allowed for by the hand lever, while the accelerator pedal cuts out the governor entirely. The low-tension magneto which has been a distinguishing feature of the Locomobile since 1905, is continued without any change whatever from the 1908 model, this also being the case where the igniter equipment is concerned, as this part of the car has been developed to a point which leaves nothing to be desired. A feature worthy of mention in this connection is the fact that the iridium steel contact points employed are now welded to their blocks, making them practically integral with the latter. Cooling is provided for by a centrifugal pump circulating the water through the honeycomb type of radiator that has long been a familiar Locomobile feature. This is supplemented by a belt-driven aluminum fan running on ball bearings, and for which an eccentric tightening adjustment is provided. Union connections are employed on the radiator,



BRAKE CONSTRUCTION ON LOCOMOBILE SHAFT-DRIVEN CAR

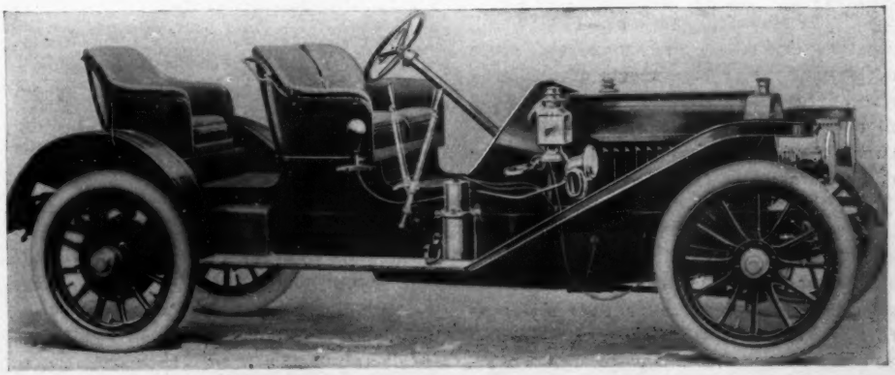
both top and bottom, and do away with the necessity of breaking hose connections when necessary to dismount any part of the cooling system. Both the throttle and spark control are effected through a screw and nut movement, instead of the bevel gears ordinarily employed, this making a considerable saving in space.

The starting crank spring, instead of being carried forward as formerly has been placed farther back, and is now completely housed in, giving this part a much neater appearance and protecting it from dirt.

The first step in the transmission of the power consists of the standard type of leather-faced cone-clutch, which, however, is so mounted as to be removable without altering the tension of its engaging spring, or, in fact, without disturbing any of its related parts. Flat springs, are employed under the clutch leather, causing the clutch to engage smoothly and without jerk. No universal has been found necessary between the clutch and the gear-set, the latter being placed about in the same position in the car, as was the case when it was chain-driven. The gear-set is of the selective type, providing four forward speeds, with but two, instead of the usual three, sliding members. Both shafts are mounted on imported annular ball bearings and the entire gear shifting mechanism is enclosed in the same housing with the driving gears. The use of but two sliding members to effect the gear changes permits of the use of a much simpler sector. Direct drive is on the fourth speed. The housing of the gear-set is of manganese bronze, with an aluminum oil pan, following out the same construction as characterizes the crankcase.

In the running gear, use is made of the worm type of steering gear, in which a complete wheel instead of sector is employed which furnishes means for taking up wear by bringing an entirely new gear face into contact with the worm. Imported ball-bearings are used in the wheels, transmission, and other parts; the wheel-base measures 120 inches, and the 34-inch wheels carry 4 and 4½-inch tires. As a touring car the body accommodates five. It is also manufactured as a runabout, with a well-raked steering post and with a body capacity for two, three or four passengers. The same chassis may be fitted with baby tonneau type of body.

The Locomobile chain-driven car regularly rated at 40-horsepower, with 5 by 6-inch cylinders, will be continued practically unchanged for the coming season, excepting in that the steering wheel has been increased in diameter, the intake manifold made of copper instead of aluminum, and beside increasing the diameter of the jackshaft the sprockets it carries for chain-drive have heavier hubs than heretofore used. This car is made with 36-inch wheels, fitted with 4 and 5-inch tires respectively, and carries a seven-passenger body. As a runabout, it is supplied with passenger accommodation for two, three or four people, and may be had with a toy tonneau.



SHAFT-DRIVE LOCOMOBILE AS A ROADSTER

The Readers' Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems and invites a discussion of pertinent subjects. Correspondence is solicited from subscribers and others.

DISLIKES PRESSURE FEED

Madison, S. D.—Editor Motor Age—The article on "Criticizes Modern Motoring" in Motor Age in the October 1 issue, page 19, by John Wilson, the cynical, is one of the best I have read in the Readers' Clearing House. What Mr. Wilson says about feeding gasoline by pressure is certainly the truth, and there is no correct place for the gasoline tank except under the front seat, where it is the most out of the way and the best protected. However, it sometimes happens that in some four or six-cylinder cars the carbureter is placed relatively high, where it really should be, on account of accessibility. When the gas is low and the car ascends a grade, it sometimes occurs that the gasoline fails to reach the carbureter. This can be very easily prevented by attaching to the tank, at some accessible place, an old tire valve, using about half the valve stem. When gasoline fails to reach the carbureter temporarily, a few strokes of the tire pump will put in enongh pressure to run a long ways. After the top of the hill is reached the valve core can be partially unscrewed to permit entrance of air into the tank. Of course the vent hole in the filler cap has to be soldered up.—H. H. Frudenfeld.

MAKING A MAGNETO

Decatur, Ill.—Editor Motor Age—I am a subscriber to your paper and take particular interest in the Readers' Clearing House, and I would appreciate an answer to the following inquiry through these columns: How can I make a magneto for igniting the mixture in a gasoline engine? Give dimensions, size of wire, etc., regarding this.—J. A. Fisher.

The simplest type of magneto to manufacture would be one of the inductor type, similar to that described in Motor Age October 8, pages 24 and 25. A magneto of this type takes the place solely of dry cells or storage battery, and can be manufactured with reasonable ease. The first essential is the six permanent magnets, at the open ends of which must be placed soft iron pole pieces. Instead of an armature, this magneto has a shaft on which are three inductors, star-shaped and made of laminations or thin sheets of soft iron riveted together. Instead of three wings to each inductor you may use two. Between the inductors place a coil of copper ribbon, wound as ribbon on a spool. Between the windings of the ribbon should be a separating ribbon of paper. Connect one end of the ribbon to one binding post, the other to the other. The magneto should be driven three or four times as fast as the crankshaft speed. Should you intend to make a magneto with a regular winding on the armature, much valuable information on its manufacture could be obtained from page 27 of the same issue of Motor Age, which gives instructions on the operation of rewinding of an armature.

CALCIUM CARBIDE IN RADIATORS

Grand Island, Neb.—Editor Motor Age—Through the Readers' Clearing House will Motor Age inform me if it would advise the use of chloride of calcium in radiators to keep water from freezing, or does it injure the metal? How many pounds to the gallon must be used in this preparation if freezing point goes as low as 20 degrees below zero?—A. J. Windolph.

The following proportions of calcium carbide are suitable for radiator use:

CALCIUM CHLORIDE

For each gallon of water	Freezing point
1 pound	27
2 pounds	18
3 pounds	–1.5
3½ pounds	–8
4 pounds	–17
5 pounds	–39

For the benefit of those readers who prefer to use wood alcohol and glycerine, the following table will apply:

Wood Alcohol		Glycerine	
Percentage in water	Freezing point	Percentage in water	Freezing point
10	18	10	28
20	5	30	15
25	–2	40	5
30	–9	50	–2
35	–15	55	–10

Half Alcohol	
Percentage in water	Freezing point
10	25
25	8
20	15
30	–5
33	–15

Half Glycerine	
Percentage in water	Freezing point
25	8
15	–5
33	–15

Calcium carbide does not injure the radiator metal, and has but slight effect on the jacket walls.

FASTEST MILE RECORD

Kokomo, Ind.—Editor Motor Age—Will Motor Age tell me the fastest official mile time made by a motor car on Ormond Beach, Fla.? What is the accepted world's record?—A. S. Hall.

The fastest official time made at Ormond was 28⅕ seconds, by a Stanley steamer in February, 1906. In this contest at Ormond, Demogeot in a special Darracq car made 2 miles in 58⅘ seconds. These are both world's records.

SINGLE UNIT COIL IGNITION

Milwaukee, Wis.—Editor Motor Age—How is the change effected of using a unit coil for a four-cylinder engine over the usual four-coil box?—Reader.

In changing from a four-unit coil to a single-unit coil, it will be necessary to remove the commutator and in its place put a high-tension distributer which combines with it a make-and-break device for the primary circuit. The wiring of your system will be as follows: From the battery to the primary of the coil, and from the other primary to the timer, or make-and-break part. The other battery terminal is grounded. One of the secondary circuit posts is grounded to the primary and the other goes to the fifth binding post of the distributer. From the distributer four high-tension wires connect directly with the plugs. In a single-unit system with distributer, you have but one coil to adjust with the result that the timing in the four cylinders will be absolutely the same. Not a few users of distributers in which a high-tension current is distributed, have trouble with short circuiting in damp weather. There is no reason why this cannot be entirely overcome by careful distributer construction, and, in fact, in a lot of the present day distributers it has been entirely overcome.

HORSES' SHOES RUIN ROADS

Oil City, Pa.—Editor Motor Age—The late Charles A. Dana once said, editorially, "The most dangerous man to follow is a specialist, namely, one who dwells so long and so intently on one subject that he becomes lopsided." This is true on the road question. The macadam road specialists claim that the motor car ruins them, which claim may be true to some extent, but it must be taken with a big grain of allowance. The writer knows of some practical, actual experiences that prove that horses' feet, narrow tires and heavy loads do far more to wear out a macadam road than the motor car. There is a new 6-mile macadam road that never had a dozen motor cars over it a dozen times, and in 1 year it has been cut up into deep ruts by narrow tires. Still another piece of 3 miles in the same condition. It is all prejudice and nonsense about the injuries a motor car does to the macadam road. If we could have a national enactment requiring wide tires on all vehicles, the same as in Germany, we would soon have fine roads.—Fair Play.

SETTING THE EXHAUST VALVE

Providence, R. I.—Editor Motor Age—Will Motor Age through the Readers' Clearing House columns inform me as to the correct manner of setting the exhaust valve of a four-cycle engine. At what point should the valve start to lift on the power stroke to obtain the best results, or, at what point should it close if that is the proper way of setting it? Can the horsepower be figured if only the bore and stroke are given? What is the horsepower of my engine with 2¾-inch bore and 3-inch stroke?—B. H. Sheppard.

The best way to time the exhaust valve is to do it at the point of closing. Many engineers differ greatly on when the valves should open; some opening it as much as 45 degrees before the end of the power stroke. In deciding when the valves should be closed, the best position is 1½ degree past the top dead center. This will approximate 1/80 of an inch, in an average size motor. The horsepower can be figured with bore and stroke given, the rating being at a crankshaft speed of 1,000 revolutions. The formula for determining horsepower is

$$H\,P = \frac{D^2 \times N}{2.5}$$

in which D is the diameter in inches, N the number of cylinders, and 2.5 a constant. In your motor with a 2¾-inch bore, the horsepower per cylinder will be 3, which for a four-cylinder engine will give a total of 12. In this formula the length of the stroke does not figure at all.

FIRESTONES IN FAIRMOUNT RACE

Philadelphia, Pa.—Editor Motor Age—After the motor car races in Fairmount park, in this city, many false reports were circulated relative to the tire troubles on Florida's Locomobile car. The exact facts relating to Firestone tires are as follows: Both No. 9 and No. 10 cars were fitted with Firestone demountable rims and standard Firestone tires, 36 by 4½-inch rear and 36 by 4-inch front. Neither car was troubled with punctures or blow-outs, but on a schedule fixed the night before the race both cars made one stop for tire replacement, in the seventeenth round. Car No. 10 made a full complete change and car No. 9 changed two rear tires. This change, as stated above, was arranged for before the race and was not made because necessary. The accident to car No. 9 was due to a break in a water connection on top of the cylinders. This accident would not have robbed car No. 9 of its second position had the mechanic noted the trouble in time and not permitted the driver to drive this car with a broken connection beyond the control. We know that in justice to the Firestone people Motor Age will correct the statement relative to car No. 9 driven by Florida in the Philadelphia race.—Locomobile Co. of America.

MAKES ZENITH CARBURETER

St. Louis, Mo.—Editor Motor Age—Will Motor Age give me the address of the manufacturer of the Zenith carbureter described in the issue of September 24, on page 21?—T. K. Cooper.

The Zenith carbureter is manufactured by L. & A. Boularde Freres, 4 Rue St. Gervais, Montplaisir, Lyon, France.

MAGETOS NOT TROUBLESOME

Asheville, N. C.—Editor Motor Age—On a 30-horsepower car, is a magneto worth the cost? Will it be more troublesome than a battery system?—P. O.

The magneto will certainly afford you adequate compensation by way of reduced ignition troubles and increased power, in spite of the fact that you can pay as much as $200 for a magneto, inclusive of its fittings, ready for installation. Magnetos for the jump spark system can be had at prices ranging between $100 and the high limit as above set down. The magneto will be less troublesome to maintain, requiring but little occasional care, by way of cleaning and oiling; during its natural life, which for a good magneto, is equal to the life of the motor.

WANTS ACTUAL HORSEPOWER

Chicago, Ill.—Editor Motor Age—Will Motor Age advise me what is the actual horsepower of a four-cylinder motor 4¼ by 4½ and a six-cylinder 4¾ by 5½ inches?—Lakota.

Motor Age is at a loss to know what you mean by actual horsepower, whether you mean the horsepower of a motor which its size would show at the rims of the rear wheels, or the horsepower which would show on a dynamometer or electric test. According to A. L. A. M. formula, the horsepower in each case is as follows: For the four-cylinder car with 4¼ by 4½-inch cylinders, 28.9 horsepower, and for a six-cylinder 4¾ by 5½-inch cylinders, 54.1.

A GASOLINE-ELECTRIC SYSTEM

Canton, Miss.—Editor Motor Age—Will Motor Age, or any of its readers, give me an opinion on a gasoline-electric motor car on which I have been working for the past 2 years? About 1 year ago, I believe, a patent was secured and cars of this type built by the manufacturers of the Columbia car, which I understand has not proved successful. A system similar to mine is being used on street cars and I therefore have taken steps to have my ideas patented. My idea is this: To use a gasoline engine to drive an electric generator to supply motive power for the car through two or four electric motors, the engine to be self-governing with an auxiliary hand governor to be used when necessary. Should four motors be used every gear on the car could be dispensed with excepting, of course, engine gears. The motors are connected direct to wheels and so eliminate driveshafts. Change speeds are by same system as is used in the Westinghouse control as applied to street car motors. It is my opinion that the weight per passenger and per drive wheel, horsepower, can be reduced over most any gasoline car now in use. The generator armature acts as a flywheel on the engine, saving weight. Anyone having had experience with a self-governing stationary gas engine will testify as to its advantages over the engine which is dependent on the judgment of the operator to regulate it by hand to meet the varying demands of the load. Watch a gasoline engine driving an electric generator, see the load of lights and motors thrown on and see how nicely it adjusts itself to take the load. Do the same thing on a motor car, and note the difference. After criticisms on my system, I will tell of my experience with an elevator, gear-driven by a gasoline engine as well as when it is driven by means of an electric motor.—R. C. Rimmer.

An electric vehicle of this nature was built by the Electric Vehicle Co., Hartford, Conn., about 3 years ago, the sale of which was discontinued over a year ago. The Daimler company, of Germany, has a great many heavy trucks operating on this principle. A Chicago concern is fitting a like system to motor trucks, in that it uses a gasoline engine, generator and electric motors, no battery of any nature being required except a small one for starting the engine. This type of power gives promise of receiving a great deal of attention, particularly if you can do without the battery, which is a very heavy affair and gives considerable trouble. It is a certainty considerable attention will be given to this type of transmission, inasmuch as it eliminates the change-speed gearing which gives a great deal of trouble in vehicles that have to endure heavy service.

TIRE SLACK WILL DO IT

Fairfield, Me.—Editor Motor Age—I find it unnecessary to rivet or tie on with rawhide old shoes with beads cut off. Simply put on with the new tire slack and blow up. I have some that have been run 1,000 miles over rough mountainous roads and they have not crawled 1-60 inch by a mark I made. This is much less work to remove in case of a puncture at any time.—Owen B. Ames.

There is certainly no advantage in troubling to rivet or lace on the old casings when it is desired to use them to protect new ones if they stay in place when simply put on slack and then blown up. This simplification of the process should encourage other motorists to try it—many of whom, no doubt, hesitated at the work involved in the other methods.

HELPS TO SELL CARS

Port Norfolk, Va.—Editor Motor Age—Are there any motor car makers who offer premiums to users of their machines, making the best suggestions as to points of improvement on their respective cars? Are there any manufacturers who make it a point to keep duplicate parts of their machines in all large cities, so that broken parts can be quickly replaced? Is it asking too much of a dealer when he tries to sell you a car if he expects to carry duplicate parts in stock? Would not an effort on the part of manufacturers to help more those to whom they have sold machines in the past, than to make such heavy cuts to facilitate the sale of new ones? Take, for instance, the cash register people and the Remington typewriter people; once a customer they count you as a friend and customer always, and are continually sending you such information as will help you in getting all possible out of the purchases that you may have made.—R. T. H.

So far as the knowledge of Motor Age

extends, there are no American makers who are offering any premiums for information of this kind, though prizes have been offered for records of the lowest maintenance expense on the greatest mileage, and at least one of these is still effective. There are few of the larger American manufacturers who do not carry very complete stocks of replacement parts in their branches in different cities, and several have made it a point not only to sell these parts at prices corresponding to their first cost on the machine itself, but also to supply them very promptly. The question regarding parts would be a most natural and logical one, and is usually asked under such circumstances. Motor Age agrees with you most heartily regarding the value of the policy of "once a customer, always a customer," and is under the impression that this is closely followed by the majority of well-known makers.

USES RADIUM DECARBONIZER

Allentown, Pa.—Editor Motor Age—Of late I have received many letters asking for more complete information regarding the decarbonizer I use. Since I do not have the time to answer all these numerous letters, I would ask that Motor Age make known that it is the Radium decarbonizer which I use, and the oil is of the Monogram brand, and the car which I drive is a Franklin. The other night I was called out of my bed to answer a long-distance telephone from Philadelphia in regard to more complete information. I have no personal interest in the decarbonizer, the oil or the car, and simply wrote the original letter for the benefit of my fellow motorists and thought they could get some good results from my own motoring experience.—Dr. Palmer J. Kress.

UNREASONABLE SALES SCHEME

Marshall, Minn.—Editor Motor Age—A sales company controlling the sales of a popular car in the state of Minnesota offers the following "inducements" to dealers: The dealer must deposit part of the payment of five cars without any security whatever with the sales company, must not sell any other car without permission from the sales company, and must keep in stock four different styles of the car for demonstration. The dealer must sell at the price which the manufacturer may set, no matter whether below what he has paid for the car or not, and if he fails in any particular to live up to the contract his deposit is forfeited to the sales company. This business proposition seems to me to be the worst jug-handled, sucker-catching scheme that ever went under the name of legitimate business. The sales company asks the dealers to furnish it capital to do business with, with absolutely no security or recompense, arranged so that the deposit may be declared forfeited at its own sweet will, and does not even agree to furnish the cars which the deposit is part payment upon. It limits the business of selling to its permission and compels the dealer to keep in stock models which may not be salable in his locality. In my opinion, this method of selling cars to dealers will spell suicide for the manufacturer if it is rigidly enforced. It will stimulate the most zealous antagonism to the car and will enlist good agents in the ranks of salesmen for other cars in the vicinity.—A. D. Hard.

ONE WAY TO GET LIGHT

New York—Editor Motor Age—Dark, on a lonely country road, and with no match with which to light the lamps, is a troublesome position for the careless motorist. A little light on the subject of what to do when thus in the dark was told me by an inveterate smoker who evolved the idea one windy day when, without forethought, he had used up all his matches. He says: "Disconnect one of the wires of the spark plug and place a piece of waste saturated with oil between the plug terminal and the end of the wire, so as to make the spark jump through the waste. A small piece of waste is enough, but great care should be taken not to fire the gas fumes arising from the carbureter."—Arthur N. Jervis.

WOOD CAR FRAMES

Chicago, Ill.—Editor Motor Age—In building a light runabout car will a frame built of hickory or white oak be sufficiently strong to support about 750 pounds and stand the usual road strains and shocks. The car is to have a wheelbase of about 90 inches. Of hickory or white oak, which is the better suited for the purpose? What would be the proper dimensions of the wood for a frame of this kind?—T. Smith.

Either hickory or white oak, if well seasoned and second growth, would suit your case admirably. It is not so easy to fit the dimensions without knowing as to the locations of the laterals. If laterals come well spaced the thickness of the side member can be reduced, and vice versa. As a general statement, Motor Age would think the section might be 1½ inches thick by 4½ inches deep, and that the side members could be tapered off to 3 inches at the ends. The iron work will have some to do with the ability of the finished frame, but these are all matters in relation to which you are no doubt already well informed.

WITHOUT A DIFFERENTIAL

New York—Editor Motor Age—Will a 2,000-pound car with 100-inch whelebase operate without a differential? It is understood that a solid live axle is used. Would the strains rounding a corner tend to break the axle and cause severe wear on the tires—these to be of solid rubber? Supposing considerable care was exercised in making the turns, could the motor car be handled successfully?—Harry Lawrence.

Unquestionably the motor car could be handled without the differential, but it would hardly be advisable to do so under ordinary circumstances, for every-day use. Motor Age believes some machines of the high-wheel buggy type dispense with the differential, but these drive the rear wheels by ropes or wire cables, which allow a certain amount of slip. On the other hand, some high-powered racing cars have been built with solid live axles. If your machine is of the high-wheel type, as the use of solid tires would imply, and is not intended to make more than 20 miles an hour, you might be able to get along without the differential; but Motor Age would advise fitting one to be on the safe side.

POSITION FOR MUFFLER CUT-OUT

Madison, S. D.—Editor Motor Age—Will Motor Age inform me, through the Readers' Clearing House, whether or not it is better to place a muffler cut-out as near as possible to the muffler.—H. H. Frudenfeld.

The best place to put a muffler cut-out is in front of the muffler so that the exhaust gases do not have to pass through any part of the muffler before reaching the cut-out. In placing a cut-out a good place is immediately beneath the footboard. In fitting the cut-out in this position, care should be taken not to have the exhaust gases directed toward the ground, but horizontally to the rear. The closer the cut-out is to the cylinders the better, as the gases are given free expansion that much sooner and the danger of back pressure on the motor proportionately decreased.

CHASSIS MADE TO ORDER

Rochester, N. Y.—Editor Motor Age—Again I ask the courtesy of Motor Age, which has so satisfactorily answered a previous query, to advise me if there are any pleasure gasoline chassis made and sold in large or small lots by manufacturers who do not and will not sell them fully equipped. The only firm I know of which does this is the Garford company, of Elyria, O.—J. Lawrence Hill.

The Garford Co. is not specially engaged in the manufacture of chassis sold in the manner you suggest, its entire output being disposed of through two distributing sources only. It might be possible to arrange with the A. O. Smith Co., Milwaukee, Wis., for work of this nature, as this company has built cars to special order along the lines you suggest.

THE UTILITY OF CLUTCHES ON MOTOR CARS

CONE clutches are not of the class in which a pound pressure of the spring means a pound pressure on the clutch face. The cone serves to multiply the pressure of the spring. In other words, there is a lever advantage in using the cone. Charles H. Schabinger, in the Schabinger, in the Horseless Age of October 2, 1907, set forth a formula, as follows:

$$\text{H.P.} = \frac{P f r R}{63{,}000 \sin O}$$

P = the assumed pressure of the spring;
f = the coefficient of friction;
r = mean radius of the cone, in inches;
R = angular velocity in revolutions per minute;
sin O = sine of the angle of the clutch. The formula transposed is as follows:

$$P = \frac{\text{H.P.} \times 63{,}000 \sin O}{f r R}$$

In this way the spring pressure may be approximated. It is important, however, to use a coefficient of friction such as will serve under practical conditions—Mr. Schabinger adapted the coefficient 0.25—which, in the author's judgment, will not hold in practice for any length of time, if leather is the facing used. If cork inserts are adopted, the coefficient would be a safe one to use and it might be even higher. The coefficients for cork are given. If the facing is of leather alone it would be wise to adopt the coefficient 0.15, as before given for an oily condition.

If 40 pounds are all that one would care to hold on the pedal, then it is plain that the value of P should be limited on that account. The ratio would then be 5:1, which ratio can be taken care of in a lever system. On this basis the dimensions of a 50-horsepower clutch, 1,000 revolutions per minute, would be about as follows:

$$P = \frac{50 \times 6{,}300 \times 0.15}{0.15 \times 9 \times 1{,}000} = 350 = \text{pounds pressure of the spring.}$$

This is for an angle of about 9 degrees and, as will be observed, the spring pressure is somewhat higher than was the wont. This merely indicates the near approach of the limit of the cone type of clutch. The value taken for r is high enough to engender spinning, which is not to be desired, and the value of R is quite as high as it ought to be in a 50-horsepower motor.

EDITOR'S NOTE—This is Part III of a series of articles on clutches by Thomas J. Fay, president Society Automobile Engineers. Part I appeared in Motor Age October 15, and Part II October 22.

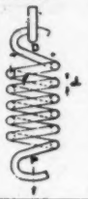
Even so, it is a matter to be ascertained, if the ability of the clutch in terms of negative torque will be adequate for a lasting clutch of the requisite maximum holding power. The constant 63,000 would have to be adjusted to suit the conditions, were it proven that the ability of the clutch in terms of negative torque falls below the desired value, which was set at double the positive torque, that is, the mean effective torque of the motor.

The question of the spring is one to be looked after with some care, and of it there is oftentimes some reason for believing the right proportions are not arrived at. The table of helical springs here given is one that will help out vastly if it is consulted. For this class of service the maximum carrying capacity in pounds can be taken. The table explains itself. The range of the table is so great that it will handle all the problems of the clutch spring and if more or less than ten turns are desired, it will be possible to figure out the resultant ability with more or less than the ten turns taken in the table. The table was compiled by Max Hess, while assistant to the author in connection with the Simplex motor cars.

FIG. 1

Helical Springs
Made of Steel

FIG. 2



DIAMETER OF STEEL WIRE—d.

Diameter of Coil—D	1/16"		1/8"		3/16"		1/4"		5/16"		3/8"		7/16"		1/2"		9/16"		5/8"	
3/4"	6.2	1.7"	65.4	.85"	221	.57"														
	1.5		24		128															
7/8"	7	2.3"	54.1	1.15"	109	.77"														
	.95		15.8		76.0															
1"	6.1	3"	49.1	1.5"	166	1"	392	.75"												
	.64		10.9		31.0		163.7													
1 1/8"	5.5	3.8"	43.6	1.9"	147	1.27"	349	.95"												
	.48		7.1		34.4		114.2													
1 1/4"	4.9	4.7"	39.3	2.35"	132	1.57"	314	1.18"	613	.94"										
	.33		5.2		26.4		83.3		203											
1 3/8"			35.7	2.85"	120	1.9"	288	1.42"	597	1.14"										
			3.9		19.8		62.6		153											
1 1/2"			32.7	3.4"	110	2.26"	262	1.7"	511	1.36"	883	1.13"								
			3		15.3		46.2		116		244									
1 5/8"			30.3	4"	102	2.66"	241	2"	472	1.59"	815	1.35"								
			2.4		12		37.9		93		192									
1 3/4"			28	4.6"	95	3.1"	224	2.3"	438	1.85"	757	1.54"	1202	1.32"						
			1.9		9.7		30.4		74		154		285							
1 7/8"			26.1	5.3"	88	3.54"	209	2.65"	409	2.12"	707	1.77"	1122	1.51"						
			1.5		7.8		24.7		60		125		231							
2"			24.6	6"	83	4"	196	3"	383	2.42"	662	2"	1052	1.75"	1570	1.51"				
			1.3		6.4		20.3		50		103		191		325					
2 1/8"					78	4.54"	185	3.41"	361	2.73"	623	2.27"	990	1.95"	1478	1.7"				
					5.4		17		41		86		159		273					
2 1/4"					74	5.1"	174	3.82"	341	3.05"	586	2.53"	935	2.16"	1396	1.91"	1987	1.7"		
					4.8		14.3		35		72		134		229		366			
2 3/8"					70	5.7"	165	4.26"	323	3.41"	550	2.84"	866	2.43"	1328	2.15"	1882	1.89"		
					3.8		12.1		30		62		114		194		341			
2 1/2"					66	6.3"	157	4.72"	307	3.77"	530	3.14"	841	2.7"	1266	2.36"	1788	2.1"	2451	1.89"
					3.3		10.4		25		53		98		167		267		407	
2 5/8"					63	6.94"	149	5.2"	292	4.16"	505	3.47"	801	2.97"	1196	2.6"	1703	2.31"	2336	2.08"
					2.9		9		23		46		84		144		231		351	
2 3/4"					60	7.61"	143	5.7"	279	4.54"	482	3.81"	765	3.24"	1142	2.85"	1626	2.54"	2230	2.28"
					2.6		7.8		19		40		73		125		201		306	
2 7/8"					58	8.32"	136	6.24"	267	5"	461	4.16"	732	3.57"	1096	3.12"	1555	2.77"	2133	2.5"
					2.2		6.8		17		35		64		110		175		267	
3"					55	9.05"	131	6.8"	256	5.43"	442	4.53"	701	3.86"	1047	3.4"	1490	3.02"	2044	2.72"
					1.9		6		15		31		57		89		154		235	
3 1/8"							126	7.37"	245	5.9"	424	4.91"	673	4.21"	1006	3.69"	1431	3.28"	1963	2.95"
							5.3		13		27		50		85		137		206	
3 1/4"							121	7.97"	236	6.38"	408	5.31"	647	4.43"	966	3.99"	1376	3.54"	1887	3.19"
							4.7		12		24		44		76		121		185	
3 3/8"							116	8.6"	227	6.88"	393	5.73"	623	4.81"	930	4.3"	1325	3.82"	1817	3.44"
							4.2		10		21		40		68		108		165	
3 1/2"							112	9.28"	219	7.4"	378	6.46"	601	5.28"	897	4.62"	1277	4.1"	1752	3.7"
							3.6		9.3		19		36		61		97		148	
3 5/8"							108	9.92"	211	7.93"	365	6.61"	580	5.47"	866	4.98"	1233	4.41"	1692	3.97"
							3.4		8.3		17		32		55		88		133	
3 3/4"							105	10.6"	204	8.5"	353	7.08"	561	6.07"	837	5.38"	1192	4.78"	1635	4.25"
							3.1		7.5		16		29		49		79		121	
3 7/8"							101	11.35"	196	9.07"	342	7.56"	543	6.48"	810	5.67"	1154	5.04"	1583	4.53"
							2.9		6.9		14		26		45		72		109	
4"							98	12.26"	192	9.66"	331	8.05"	526	6.9"	785	6.04"	1118	5.37"	1533	4.83"
							2.8		6.9		13		24		41		66		99	
4 1/8"									183	10.27"	321	8.56"	510	7.34"	761	6.41"	1084	5.71"	1487	5.14"
									6.7		12		23		37		59		91	
4 1/4"									180	10.88"	312	9.09"	495	7.79"	739	6.93"	1052	6.06"	1448	5.45"
									6.5		11		20		34		54		85	
4 3/8"			R	B					175	11.36"	303	9.45"	481	8.25"	718	7.22"	1023	6.42"	1409	5.78"
			C						4.7		10		18		31		50		76	
4 1/2"									170	12.32"	294	10.9"	467	8.75"	698	7.64"	994	6.79"	1363	6.11"
									4.4		9		17		28		46		70	
4 5/8"									164	12.99"	284	10.76"	455	9.22"	679	8.07"	967	7.18"	1326	6.46"
									4		8.3		15		26		42		64	
4 3/4"									161	13.62"	279	11.35"	443	9.73"	661	8.51"	941	7.57"	1291	6.81"
									3.7		7.7		14		24		39		59	
4 7/8"									157	14.25"	272	11.96"	431	10.25"	644	8.97"	917	7.97"	1258	7.17"
									3.4		7.1		13		23		36		55	
5"									153	15.29"	265	12.26"	421	10.78"	628	9.43"	894	8.39"	1227	7.55"
									3.2		6.6		12		21		33		51	
Diameter of Wire—d	1/16"		1/8"		3/16"		1/4"		5/16"		3/8"		7/16"		1/2"		9/16"		5/8"	

A—Maximum carrying capacity in pounds.
B—Deflection at this lord for a spring with ten coils.
C—Coefficient of stiffness, which can be used for calculating the deflection of a spring with N coils: $\delta = \frac{P}{N}$

32.C

TABLE OF HELICAL SPRINGS

Neglecting the question of slipping from the utility point of view, we can take up the matter of the multiple-disk type of clutch with the idea of showing how it can be made to hold with greater certainty than would be the case were the disks plain. The Hele-Shaw clutch, for instance, as will be shown in Fig. 6, is of the multiple-disk type, but the disks instead of being plain are provided with wedge-shaped indentations at a radius somewhat greater than the inside diameter of a disk.

The utility of the wedge-shaped indentations would be the same as that of the cone bearing surfaces of the cone clutch. In the Hele-Shaw clutch it is not necessary that the disks should bear upon their faces, since the clutching effort may be confined to the engagement of the wedge-shaped depressions. A clutch of this sort has but a small bearing surface per disk, thus making each disk very effective, and as to the effect of the high pressure on the small surface, it is compensated for by the use of a considerable number of disks. The disks themselves are very thin, and it is possible to use a considerable number of them within limited space. The other features of this clutch will scarcely require attention, since

they are plainly shown in the illustration, and the idea here is to point out the difference between this and simple multiple-disk clutches.

The Mercedes type of spiral band clutch is probably the best known of any in this class. It consists essentially of a flat helical spring wrapped around a hardened steel drum. One end of the spring is anchored to the driving member and the other end is actuated by means of a spring pressure through a lever arm. Intervening between the spring and the lever arm is a sliding cone wtih a face-angle of about 52 degrees, ending in a crest and a slight reduction in the diameter beyond. The spring pressure is thus multiplied, first through the good office of the lever arm; second, by the wedging action of the sliding cone, and finally, by the wraps of the helical band around the drum. There are usually from four and one-half to five wraps of the band on a drum approximating 6½ inches in diameter, differing slightly in this respect in the different types of cars. The drum is of hardened alloy steel, the texture of which metal is so very close as to permit of extremely high pressures without any eroding effect at all. If the drum is hard, it is true that the helical bands must not only be hard as well, but of high strength, since the pull on the wrap nearest to the anchorage reaches a very high figure, indeed.

There is a certain amount of complex mechanism in connection with clutches as above described, and the clutch, Fig. 7, while it belongs to the same genera of clutches, is designed with the idea of eliminating the complex features. In this spiral band clutch the helical band is wrapped around a drum of the cone type; one end of the flat band is anchored to the driving member, while the other end is free. To engage the clutch the drum itself is caused to telescope the helical spring and by a difference in angle between the drum and an outside housing, the free end of the spring if pinched in such a way as to constrict the same, thus affording the requisite negative torque to transmit the torque of the motor.

In this type of clutch freedom from lever arm troubles is a self-evident feature, but if the lever arm is eliminated, high pressure has been substituted instead, and this high pressure comes on a small area at the end of the helical band, which should in time erode the band itself or cause it to burrow into the surface of the drum in juxtapos on. These evil influences can only be counteracted if the materials used are of a character to afford the greatest possible hardness without brittleness. In one or two cases it was suggested that a hardened tool steel insertion be used at the point of maximum pressure. This might be a good idea, but the author does not know of any case in which this has been taken advantage of.

While the industry has developed a considerable number of clutches now obsolete, yet even so, there are one or two ideals that persist in coming to the fore at rather frequent intervals. Take, for instance, the question of an individual clutch for each of the speeds in the gear-set. This scheme has been used quite extensively and has many advantages, among which might be mentioned the fact that the gears are retained in constant mesh. A scheme of this sort resolves itself into the question of whether or not a separate clutch for each gear is preferable to a single clutch for all of the gears and a sliding mechanism by means of which the gears may be engaged. There are very few apparently whose preference seems to run in the path of multiple clutches to get away from clashing gears.

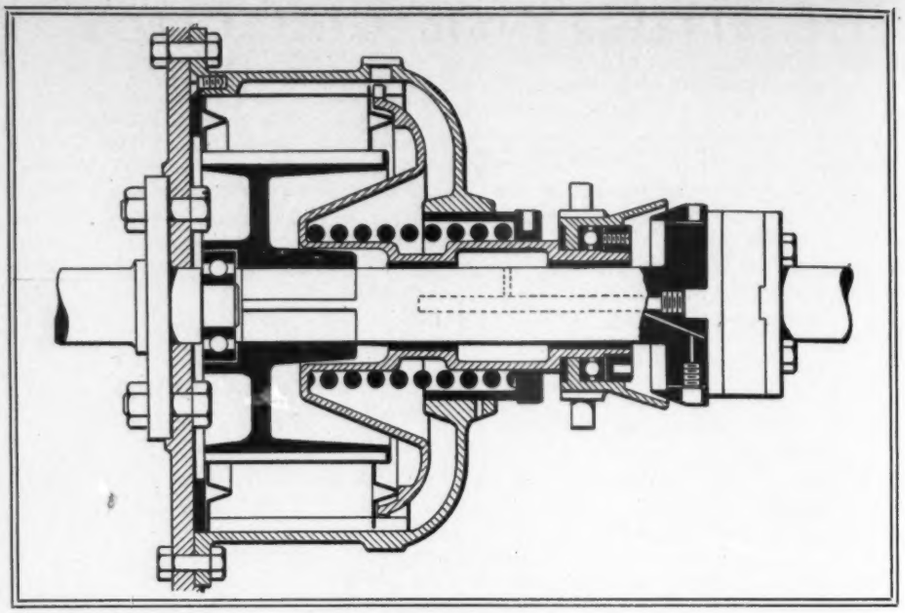


FIG. 6—HELE-SHAW CLUTCH

There is still one more idea that seems to be buoyant, although it has not been exploited to any great extent up to the present time. This idea has for its basis the use of a unit clutch in the ordinary way, and the gears in the gear-set in constant mesh. In order, however, that the speeds may be changed, sliding cones provided with slots, teeth or other means of engagement afford the methods by which the respective gears in proper selection are locked in place and set to perform their functions.

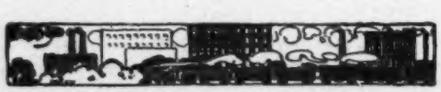
Obviously this is a means for side-stepping the clashing of gear teeth, hoping thereby to save them from the results of clashing, but it must be plain to even a casual observer that the trouble is merely transferred to another point. It seems to be true that there is less wear and tear due to the clash meshing of gear teeth than follows the use of other means of locking members, such as pins, a screw-driver joint, etc.

It was said that if the engaged faces of the clutching members were direct the pressure of the clutch spring would have to be sufficient, in view of the coefficient friction of the materials used for the clutching purpose. It was pointed out in the case of the Mercedes clutch that an intervening lever arm might be devised in some way as to multiply the pressure of the spring, and it was there intimated that a cone-face might be so shaped as to afford a further lever advantage, due to the wedging action. The use of the spring tabulation previously given will be much facilitated if information is at hand bearing on the question of the lever advantage.

It is easy enough to see to what extent a lever arm will decrease the needs by way of a spring. It will be remembered also that a means was afforded for determining as to the magnitude of the advantage if the simple wedge is used in connection with a lever arm. Nothing remains, therefore, but to exploit the means by which the advantages of the cone-type of clutch may be fixed.

The first question is one involving the disengagement of the clutch. To engage is a necessity, and to prevent slipping is desirable, but, as before stated, we must know that the disengagement will be sure. With metal to metal contact, considering such metals as are likely to find their way into clutches, the disengagement would not meet with any unusual conditions. If, on the other hand, leather—or such other materials as would act in the same way—be used, it can be the cause of sticking and the disengagement might be attended with unusual difficulties.

If a cone clutch is allowed to slip for a time it will get hot. If it is then allowed to stay engaged for a considerable period, it will disengage with difficulty. The prime reason for this lies in the fact that during the period of slipping, the



female member—of metal—will be heated more than the male and will expand more. The members will then nest closer and when the clutch members cool off, the engagement will be under far greater pressure than that due to the normal pressure of the spring.

Leather faced cone clutches then are not suitable for the class of work in which slipping is intentional, with a view to controlling the speed of the car even for a short time. The expansion of the male member due to heat will be as follows:

$e = (1 + f \times {}^{\circ}F)\ D$

In which:

e = total expansion due to heat.

f = the coefficient of expansion of the materials.

°F = increase in temperature in degrees F.

D = mean diameter of the member, in inches.

It will be well to take into account the fact that the male member is insulated as against heat, the leather acting as an insulator, so that little or no expansion will be noticed in that member.

Since slipping cannot be prevented with certainty, an allowance should be made in the designing of the pedal system, such as would assure to the operator unquestioned ability to apply enough pressure to enable him to disengage the clutch. Since there is a limit to the ability of the operator to apply pressure, there should be such a lever advantage provided as would assure the disengagement of the clutch with a predetermined effort well within the ability of a person of no great strength.

If it can be assumed that a person of no great strength can press on a pedal on a basis of 100 pounds, then it is safe to say the clutch should be designed to respond to that pressure under the most severe conditions. Under ordinary conditions, however, the pressure should not exceed, say 40 pounds. This latter pressure would take into account the resistance of the spring only, on the assumption that normally sticking would not ensue.

In a cone clutch the resultant of the pressure of the spring will be greater than that pressure. The coefficient of friction, however, undergoes the equivalent of a change, in that the coefficient becomes much diminished during the time the members are engaging, because of the manner of the engagement. This is explained on the basis of the effect of screwing one member into the other as it were, which is what happens, since during the act of engaging the driving member if at a higher angular velocity while the driven —male—member is being pressed deeper into the engaging position. The result is a point on the periphery of the male member will describe a spiral orbit during that period.

Members that cannot be telescoped at all by fair axlewise motion may readily telescope if the spiral motion is imparted to the one of them. It matters not at all if there is an actual diminution in the coefficient of friction, since the resultant of the process is the equivalent of a diminished coefficient.

Robertson's Performance

(Continued from Page 18.)

changes in the fourth and eleventh laps, but the three stops in front of the grand stand were timed by stop watch and were as given. If the minutes and seconds lost in front of the grand stand were deducted the times for his eleven laps were as follows:

Lap 1	20:54
Lap 2	19:43
Lap 3	20:17
Lap 4	25:50
Lap 5	20:53
Lap 6	21:30
Lap 7	20:36
Lap 8	20:26
Lap 9	20:06
Lap 10	20:55
Lap 11	24:12½

This shows that he actually drove the second lap in 19:43, which was in all probability the fastest given lap of the eleven. From these figures it is conclusively shown that he drove eight of the eleven laps in less than 21 minutes to the lap—a most remarkable driving performance.

Not less interesting than the actual time consumed by him in driving the different laps was the reception accorded him as he swept past the grand stand, in spite of the fact that he was the thirteenth car to start on the course. The parting cheer he received marked him as the prime favorite of the day. Many enthusiasts were disappointed when he stopped at the end of the first lap. When he completed his second lap he came thundering past the grand stand, hot in pursuit of No. 11 Acme, and gave the spectators an introduction to a few of the grand stand thrills they were to experience later. On his third flight he was going only at medium speed; the fourth time around he stopped to take on a new tire, but on the next few trips past he electrified his admirers, hitting a particularly fast pace in the fifth, going still faster in the sixth but stopping for gasoline, oil and water at the end of the seventh. When he passed completing the ninth lap he was traveling faster than at any previous time and the grand stand crowds, realizing he was a certain victor, barring accidents, gave him a tremendous cheer. The following lap, the tenth, he was traveling faster than on any previous time, and his entry into the stretch leading to the grand stand was signaled by a wave of white that swept over the crowd as hats and handkerchiefs were waved in the air while he sped by. The finishing lap was a complete ovation, one in which the pent up and almost frosted enthusiasm of the 10,000's of spectators broke forth simultaneously as he flashed into the home stretch for the last time, and as the crowds realized he was beating the Isotta by a margin of a minute or over. As the fleet Locomobile swept down the stretch the crowd closed in behind, literally covering the road and making the progress of the following cars absolutely impossible. The crowding on the course continued to the grand stand, where it was rendered doubly worse by scores of cars which had been parked along the roadside moving on to the course and speeding in the direction that the remainder of the cars were coming. No visible effort was made to stop this, and in a few minutes later the announcement was made that the race was officially declared off.

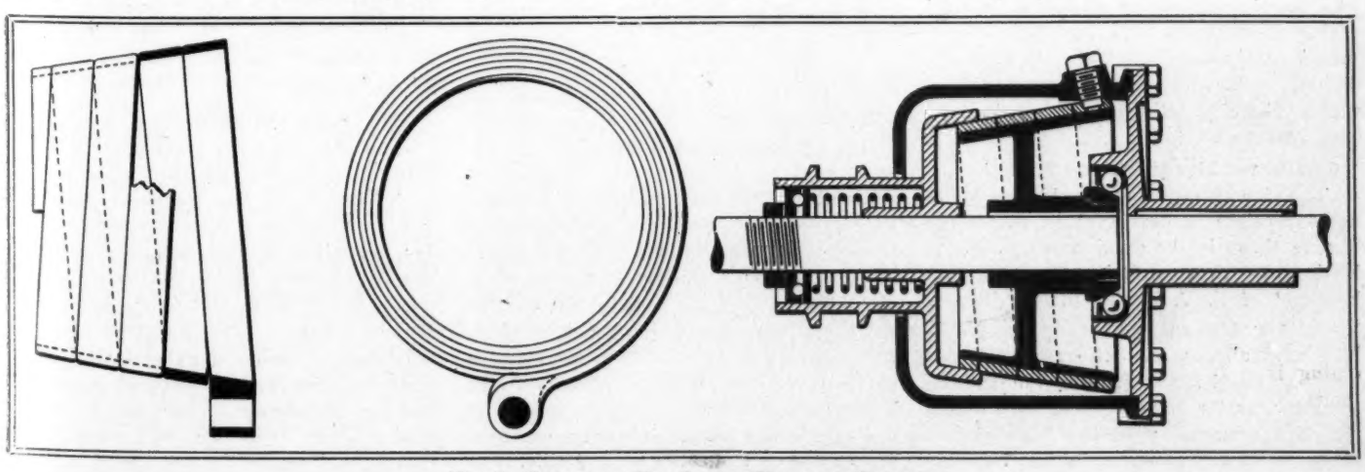
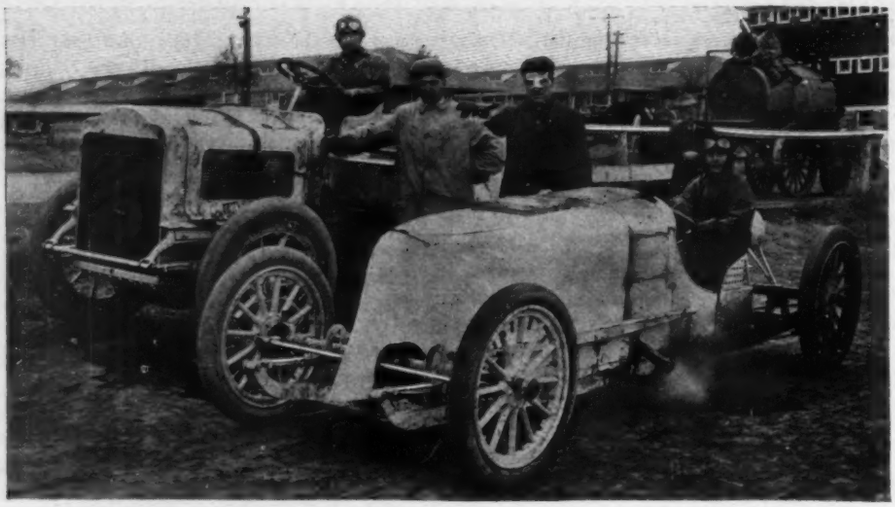


FIG. 7—ELLSWORTH-FAY CLUTCH BAND AND CLUTCH

From the Four Winds

N S E W



THE WHITE SQUADRON WHICH STARRED AT KANSAS CITY MEET

Bonnell Heads Ticket—New officers have been elected for the ensuing year by the Cleveland Automobile Club, W. F. Bonnell taking the presidency, Harry Vail the vice-presidency, Windsor White the treasurership and C. J. Forbes, Jr., the office of secretary.

Club Starts School—The Kensington Y. M. C. A., of Philadelphia, has inaugurated a motor car school, with an advisory committee consisting of Albert Kirk, assistant manager Quaker City Automobile Co.; A. E. Maltby, manager Winton branch; James W. Florida, superintendent Locomobile branch, and Archie Hughes, of Foss & Hughes. These men will each lecture on various branches of motor car construction.

Too Much Water—Philadelphia motorists are kicking over the too liberal "sprinkling" of asphalted streets in the business sections of the city. Not a few accidents have been ascribed to the skidding of cars when brakes are suddenly applied. Even the city's mounted police who patrol the business section are siding with the motorists, and say their horses cannot safely negotiate the "lubricated" asphalt surface at a faster gait than a walk. The city fathers have promised to look into the matter.

Garage vs. Livery Stable—That the locating of a garage near residences does not depreciate property values, rather increases them, is the opinion of Dr. G. A. Bading, health commissioner of Milwaukee, and of E. V. Koch, building inspector. Both were comparing the livery stable, now almost an extinct species of building in Milwaukee, with the garage as to the matter of health and they found much to compare, with the big balance in favor of the garage. In his long experience, Mr. Koch has received no protests from residents because of garages locating in the vicinity and he thinks it peculiar. He has issued many permits for garages in residence districts, while under all written and unwritten laws in the interests of health the livery stable must keep its distance.

Duryea Will Help—Associated with L. M. Bradley, manager of the publicity department of the American Motor Car Manufacturers' Association, which is conducting the show that opens New Year's eve in Grand Central palace, New York, will be Charles E. Duryea, who will prepare the mechanical articles telling of the changes offered for the approval of the public which attends the big motor car exhibition.

Aristocratic Thieves—Thieves, who ride in motor cars, have been wreaking havoc in the rural districts near Sandusky, O., recently. Complaints of all kinds of petty thievery are coming in. August Fischer, a farmer reports the loss of 24 bushels of potatoes, which were carted away by two men in a motor car; others report similar losses. A vigilant watch is now being kept in an effort to apprehend or identify the marauders.

Hill-Climb for Denver—The Denver Motor Club announces a hill-climb for November 21 up Chimney Gulch to Lookout mountain. The hill will be divided into two sections for the climb. All classes of cars will be run to what is known as the half-way house, 1¾ mile from the start. The final will be a climb to the top for the five fastest cars in the previous trials. The distance to the top from the start is 3½ miles. The grade to the half-way house will run from a short distance at the start from 3 to 5 per cent, then averages 12 to 15 per cent for the next ¾ mile, then 18 to 20 per cent for the balance of 1¾ mile. The second half is steep and has one grade of 31 per cent. The roadbed is hard and good. A contract has been made with a new railroad company for the exclusive use of its line for that day to haul the spectators from Denver to the hill at Golden, about 12 miles.

Hartford Vacancy Filled—At a meeting of the board of governors of the Automobile Club of Hartford, J. D. Anderson was elected secretary of that organization to fill the vacancy created by the resignation of G. K. Dustin, now in the west in the service of the Susquehanna Railway, Light and Power Co.

Energetic Farmers—Fruitland township, Michigan, is spending a large amount of money on roads this year and is placing them in excellent shape. Most of the bad hills have been clayed and all of the roads are being graded and leveled. If the present movement is kept up Fruitland's roads will soon compare favorably with any in the country.

Cleveland's New Road Opened—The new road of the Cleveland Automobile Club, a 3-mile stretch, built by this body just east of the city limits, was formally opened last Saturday by a committee from the club. This is the only road of its kind in the United States. It is on one of the worst stretches in the state, and from start to finish has been built by the Cleveland club, the members of which, with their friends, have financed the project.

Dealers Going to Show—The National Retail Dealers' Association has selected the show in Grand Central palace as its headquarters in New York during exhibition week. The association is made up of the dealers and agents for the leading American cars. Following this decision, the A. M. C. M. A. management of the palace affair volunteered to provide accommodations for all who attend. The president of the association is C. F. Jensen, Joliet, Ill., while J. A. Crum, secretary, is located at Oshkosh, Wis. Mr. Crum will have personal charge of the headquarters at the palace.

Club Paper Planned—The Automobile Club of Maryland has decided to enter the field of journalism and print a publication to be known as the Maryland Motorist. The first number will appear next month. The committee having this publication in charge comprises Frank W. Darling, chairman; M. S. Hess, James S. Reese and Emanuel Daniel. The Maryland Motorist will contain topics of general interest to motorists, but will be devoted mostly to matters of interest to car owners in the state. There will be no subscription charge and copies of the paper will be mailed to every motorist in the state and

to the various clubs in the country. The first issue will consist of twenty pages and the paper will be increased in size as the needs demand.

Wise Mayor—Mayor F. C. Evans, of Riverside, Cal., is making a trip through the middle west, looking after motor car fire engines, as his city expects to purchase one soon. He spent several days in Indianapolis and investigated the motor fire-fighting apparatus manufactured by the Howe Engine Co., of that city.

After Good Road Converts—A party of Milwaukee Automobile Club members will make a run to Monroe, Wis., on November 7 to convert the Green County A. C. Addresses will be made by leading owners and members will spread the gospel of good roads and co-operation. The Green County club is the biggest organization in southwestern Wisconsin, and has a membership of fifty enthusiasts.

Cups for Loco Drivers—To show its appreciation of the way in which the drivers of the two Locomobile cars in the Fairmount park race handled Firestone tires and the results shown, the Firestone Tire and Rubber Co. has presented to the drivers of these machines, Robertson, the winner, and Florida, the only man who succeeded in passing his team mate, with souvenir cups, and to the mechanics, Ethridge and Connelly, respectively, artistic medals.

Seeks Road Improvement—The board of directors of the Automobile Club of Hartford has accepted the invitation of the corresponding body of the Automobile Club of Springfield to visit the armory town for the purpose of discussing some means to be adopted by the clubs mutually for the betterment of the roads between the two cities. Henry E. Marsh, proprietor of the Cooley house in Springfield, and a member of the good roads committee of the Springfield club, has extended both clubs an invitation to an informal dinner on the same evening.

Busy in Baltimore—The Automobile Club of Maryland has accepted the offer of the Baltimore county commissioners to give the club 800 signboards and furnish the posts for the same to be placed at the most suitable points along the roads in Baltimore county. The only requirement made of the club is that it shall paint the signs and place them in position at points along the roads for the benefit of motorists on touring trips. The club, not to lose any time, has already decided upon the location of 250 of these signs. The club has decided to have a series of tours and contests at various times in the very near future. The first of these will either be a hill-climbing or a non-motor stop sealed-bonnet contest, while it has also been decided to have an endurance test. The committee in charge of these contests and tours consists of Joel G. Nassauer, chairman; G. W. Chapman, George S. Dickey, Thomas E. Young and H. M. Rowe.

Old Rambler's Steady Service—I. M. Case, of Laramie, Wyo., is en route from his home to New York, driving a 1904 single-cylinder Rambler model E, which has seen steady service for the last 5 years. The car is equipped with a top, four extra tires, large box on rear, rope, tackle, etc., a tent and complete camping outfit and two heavy suit cases.

November Climb—A hill-climb will be held next month under the auspices of the Automobile Club of Maryland. The climb will be in compliance with the rules of the American Automobile Association and will be open to dealers as well as club members. A large entry is assured. The date for the contest will be about Thanksgiving, probably on that day. The committee in charge of the event, which consists of J. G. Nassauer, chairman, Dr. H. M. Rowe, Thomas G. Young, G. S. Dickey Frank W. Darling and Walter Chapman, will make a test of a number of hills next week previous to picking out the best course. Dr. H. M. Rowe, president of the club, will give a president's cup to the most successful contestant, while Thomas G. Young also has donated a cup for competition in the event.

Races at Atlanta—Three good races were run off in connection with the motor and good roads day of the Georgia state fair. Only Atlanta-owned cars took part. Fairly good time was made, considering the soft and dusty condition of the practically unbanked half-mile track. The day promised to pass off without an accident and did until the last lap of the last race of the day when a Thomas-Detroit 40 went into the inside fence just before the last turn was reached and threw the driver, F. W. Block, and the mechanician, Carl Wall, high in the air, overturned the car and made a mess of things generally. Neither man was seriously hurt, but the car was badly wrecked. A four-cylinder Buick won the class for cars costing less than $2,000, and the class for cars costing less than $3,000, while a Stearns six captured the free-for-all. Thousands saw the motor races.

Motorists Will Organize—A movement is now under way to organize the motorists of Moline and Rock Island, Ill., and Davenport, Ia., into a club to be known as the Tri-City Motor Club. W. H. Van Dervoort, president of the Moline Automobile Co., of East Moline, Ill., is in line for the presidency. There are over 300 owners in the three adjoining cities and the outlook for a strong organization is considered promising.

Governors Will Talk—Arrangements are under way for another meeting of the governors of the New England states to discuss problems of vital interest to the different commonwealths. This meeting will be held in Boston and Governor Guild will preside over it. One of the main features of the meeting will be a discussion of highways and how best to preserve them from the wear and tear of motor cars. So many cars use the roads of New England now that the annual expense each year for maintenance alone is growing to be a big sum. State highway engineers will talk on the subject and the motorists will have a chance to be heard also.

Growing Club—The Automobile Club of Delaware county, but 2 years old, furnishes a most striking example of rapid growth and virility. Starting in October, 1906, with forty-eight members, it now boasts 220. Not only has it a large and growing membership, but it has become a force for good in such matters as road building and improvement, the scotching of too radical motor legislation, the defense of motorists generally against the exactions of rural constables and magistrates, etc. Through its work touring conditions in Delaware county have been vastly improved, and the club is working in conjunction with the Philadelphia and Baltimore clubs to bring about the complete rehabilitation of the old Baltimore pike and thus insure a first-class route from New York and Philadelphia to the south, one which long has been considered necessary.

BIRDSEYE VIEW OF CARS PARKED AT FAIR AT SPOKANE, WASH.

Among the Makers and Dealers

How with Haynes—S. M. How, formerly with R. M. Owen & Co., has joined the traveling force of the Haynes Automobile Co., Kokomo, Ind.

Levy in For Himself—George B. Levy, who has been secretary and sales manager for C. A. Coey & Co. for the past two years in Chicago, has organized the Standard Automobile Supply Co., at 1428 Michigan avenue.

Small Milwaukee Fire—The plant of the George T. Stehling Mfg. Co., 543-549 Tenth street, Milwaukee, maker of wagons and motor car bodies and wooden accessories, was damaged $3,500 by fire last week. The company is not inconvenienced, excepting in delivery of stock already prepared.

Handling the Ford—The Ford Sales Co., of Utica, N. Y., has been formed by Frank E. Henabray and A. P. Howarth, two of the younger business men of the city. The company will sell the Ford product in the counties of Oneida and Herkimer. Mr. Henabray was formerly connected with the New York Automobile Co.

Bowser Buys Truck—S. F. Bowser & Co., manufacturers of gasoline tank systems, have purchased a 5-ton truck from the Couple Gear Freight Wheel Co., and it has been put in service between the Pennsylvania railroad yards and the company's plant. The distance is ⅛ mile and includes two curves and a 2 per cent grade. The truck is to supplant two two-horse trucks.

New Transportation Company—The Bucyrus Transportation Co. has been incorporated at Bucyrus, O., with a capital of $5,000, by C. R. Rowe, J. K. Myers, Jacob Bach, Charles Quaintance and F. A. Walther. A twenty-passenger motor car will be secured and regular trips made to New Washington, Tiro, Sulphur Springs, Chatfield, Lykens, Lemert, Benton, Oceola, Wyandotte, Monnett, New Winchester, Caledonia, North Robinson and Leesburg. It is expected to have the line in working order at least by the first of December.

New Stepney Deal—The Excelsior Supply Co., of Chicago, is soon to take on the distribution of the Stepney spare wheel for the middle west. The Spare Motor Wheel of America, Ltd., now has three distributing points in the United States, namely: the American Stepney Spare Wheel Co., 1773 Broadway, New York city, for the east; the Excelsior Supply Co., of Chicago, for the middle west, and the Auto Spare Wheel Co., of Kansas City, Mo., for all territory west of the Mississippi river. The company will give up its retail store at 236 Michigan avenue, Chicago, and Sales Manager Morrow will divide his time between the three distributers, assisting them and their agents in properly placing the Stepney before the people.

Will Sell Second Hands—The Barter and Exchange Co. is a new concern in Center avenue, east end, Pittsburg, which will do a business in second-hand cars.

Has a New Name—The Colonial Automobile Co., which has been located in Walnut street, Pittsburg, for a long time, has changed its name to the Mutual Automobile Co., but will retain the same location and agencies as before.

Brush Expanding—The Brush Runabout Co., of Detroit, Mich., has outgrown its present quarters, where it has a floor space of over 60,000 square feet, and is moving a portion of its shops to another factory. This will assist the company greatly in its deliveries, in which it now is 3 weeks behind.

Would Buy Tools—The Reliance Iron Works, of Stevens Point, Wis., is building a new machine shop which will include a large garage. The building is to be 45 by 65 feet in dimensions, the garage to occupy half of the first floor. The company is in the market for repair tools and equipment. F. A. Sustins is proprietor.

Fuller Opens In Denver—The Fuller Automobile Co., of Angus, Neb., is building a garage and salesroom on Cleveland place, between Fifteenth and Sixteenth streets, in Denver. Sheldon & Thomy will be the Denver representatives for the firm, conducting a general sales business, as well as repairs and storage. The company intends to eventually remove its factory to Denver.

Has Pope in Indiana—Several business men of Indianapolis have organized the Best Automobile Co. and will handle the Pope-Toledo in Indiana. The company has been organized with $20,000 capital and will locate as soon as suitable quarters can be found. William N. Gates, Edward E. Gates and Edgar Updike are the directors of the concern. The Pope-Toledo formerly was represented by Frank A. Beck, a livery man, who will continue in the livery business and will also conduct a motor car storage and repair shop.

Anticipates Big Year—In preparation for a big increase in business the Penn Motor Car Co., Philadelphia, agent for the Mitchell, will soon abandon its present quarters at 236 North Broad street, having taken a lease on the big three-story brick building at the northwest corner of Broad and Cherry streets, at the lower end of the row, where a large force of men is now at work making the necessary alterations. The new Mitchell quarters are 50 by 200 feet in dimensions, giving a combined floor area of 30,000 square feet. Manager Walter Cram says he expects to move by October 1. His company has contracted to dispose of 300 Mitchells for the season of 1909.

Marinette Move—The Marinette Auto Co. of Marinette, Wis., has removed its garage and repair shops to the Cook building, which has been entirely remodeled to suit its needs.

New Denver Agencies—The following agencies have been added to the Denver list quite recently: Monarch, H. H. Martinstein; Auburn, Cross & Van, Hoogenhuyze; Apperson, Tobin Motor Car Co.; Stearns, Joseph D. Batchelder.

Storle Will Move—The O. G. Storle Valve Co., of Kewaunee, Wis., maker of brass valves and fittings for motor cars and boats, supplying many of the big factories in the east, will remove its plant to Fond du Lac, Wis., where it will have better shipping facilities and a better territory.

New Quaker Concern—Jackson cars will be hereafter represented in the Quaker City by the Jackson Motor Car Co., of Philadelphia. Quarters have been secured in the big garage and salesrooms of Prescott Adamson, at the northwest corner of Broad and Spring Garden streets, where the Columbia and Renault are handled also by the company.

Weed Garage Sold—The Weed garage, one of the leaders in Toledo, has been sold to August B. Uhl and Thomas R. Cook, the latter having been connected with the city water works department for some time. The garage has been under the management of J. V. Thomas, who will remove to Chicago about the first of the year. Mr. Cook will look after the office of the concern, while Mr. Uhl will act as general manager.

Not Maker of Bakers—The Baker Motor Vehicle Co. of New York, doing business at 1788 Broadway, New York city, has been forced into involuntary bankruptcy by the action of some of its creditors. This action has been anticipated for sometime, in fact, ever since a year ago when the business formerly carried on by the C. B. Rice Co., was reorganized and carried on by the new company in the hope of working out the debts which had been contracted under the old management. It is and it was impossible for the company under the business conditions existing for the past year, to operate at a profit, and the creditors deemed it advisable to cause the liquidation of the concern. This company has no relation to the Baker Motor Vehicle Co., of Cleveland, except that it sells the cars made by the

last mentioned company. As soon as the bankruptcy proceedings are ended, it is expected the business will be completely reorganized and carried on with new capital put into it.

First Burdick Out—The Burdick Motor Car Co., of Eau Claire, Wis., has completed its first car, a 50-horsepower Burdick Greyhound, and is demonstrating in western Wisconsin.

Vetter Succeeds Hazlett—A. C. Vetter has been succeeded as Pittsburg manager of the Goodyear Rubber Tire Co. by W. A. Hazlett. The agency is located at 5988 Center avenue, east end, and will now be under the factory management.

More Territory For Doane—J. E. Doane, for the past 2 years Syracuse sales representative for the H. H. Franklin Mfg. Co., has had his field of activity added to by including that portion of New York state which is east of Rochester to the Hudson river.

Neustadt Out—J. H. Neustadt announces he has totally severed his connection with the Neustadt Automobile and Supply Co. of St. Louis, and that every debt for transactions before August 3 will be paid by him on behalf of the former stockholders. Mr. Neustadt has not made any plans for the immediate future.

New Lozier Agents—W. S. M. Mead, manager of the eastern sales agencies of the Lozier Motor Co., has closed a number of new eastern agencies for the Lozier company. Among those who will represent the Lozier car in 1909 are the following: Westcott Garage Co., Utica, N. Y.; A. C. Foss, South Norwalk, Port Chester, Stamford and Greenwich; C. S. Ransom, Albany, N. Y., and Newburg Auto Co., Newburgh, N. Y.

Has Larger Engine Factory—The Davis Mfg. Co., Sixth street, Milwaukee, is completing arrangements for building a new factory to enable it to build motor car and marine gasoline engines on a larger scale. The company has received large orders from motor car manufacturers since July 1 that have necessitated the employment of day and night shifts. The new factory will be situated at Fifteenth avenue and Park street on a tract 205 by 218 feet. The main building will be 100 by 150 feet in dimensions.

More Room for G & J—The G & J Tire Co., of Indianapolis, is breaking ground this week for the erection of a large new building. The new building will, when completed, give the G & J factory about 50,000 square feet of additional floor space, which will be devoted exclusively to the manufacture of G & J tires. It is running 24 hours a day. The reduction in prices will have no effect on the quality of 1909 G & J tires, B. C. Dowse, president of the company, states. The reduction in cost of production has been brought about by improvement in the methods of manufacture, which has resulted in fewer replacements on guarantee, and increased factory capacity, which has largely reduced the overhead expense, he declares.

Tradesman Engaged—The engagement of G. G. Luthy, secretary of the Bartholomew Co., and Miss Elizabeth Radley, is announced. The wedding will take place early next spring.

Morton in Trade—Frank U. Morton has started in the motor car business at 5902 Baum street, east end, Pittsburg. His specialties will be lamps, radiators and general repair business.

Kansas City Changes—The agency for the Apperson in Kansas City has been taken by the Pioneer Motor Car Co., 3028 Gillham road. Charles Dinklage is manager. The Franklin Motor Car Co., Lewis A. Robertson, manager, has been incorporated in Kansas City and is soon to open a garage on Grand avenue.

Big Cleveland Deal—One of the biggest changes that the Cleveland retail field has seen in years is now taking place, and upon its completion the Metropolitan Motor Car Co., of this city, Pierce and Knox, agent, will have been absorbed by the Studebaker-Garford combine. The entire garage of the Metropolitan company will be used by the new concern. In addition to the Studebaker-Garford, the Studebaker electric pleasure and commercial vehicles will be sold by the new concern, as well as the E-M-F. The general garage work of the Metropolitan will be continued, with the entire Metropolitan staff, as it now stands, in charge. The general offices of the Studebaker company will be upon the second floor of the Metropolitan, while a large portion of the lower floor will be partioned off for a show room. A. R. Davis, secretary of the Garford company, will be the head of the new concern, while under him will be four separate department heads. In addition to this, the new company will also have a great deal of state territory, and to look after this Davis has secured Joseph D. Porter, formerly New York manager of the Wayne. Porter will have charge of the state work with a staff under him, while all will be under the general direction of Davis.

Monarch Change—The Monarch Motor Car Co., of Chicago Heights, Ill., announces the transfer of J. E. Garnett from Wichita, Kan., to Kansas City, Mo., and has appointed as his successor, R. R. Hayes. This appointment becomes effective October 1.

Buick Branch in Philadelphia—Abandoning its Philadelphia representative through the Keystone Motor Car Co., the Buick Motor Car Co. has established a branch house at 235-237 North Broad street, with Edward Wilkie as manager. He will be assisted by Charles W. Mann.

Anderson Increases Stock—At the annual stockholders and directors' meeting of the Anderson Carriage Co., Detroit, resolutions were passed increasing the capital stock of the company from $300,000 to $500,000. Plans have been made for the building of 1,000 electric cars and 15,000 horse-drawn vehicles.

News From Washington—The Stoddard-Dayton agency in Washington, D. C., has been given to the L. P. Dorsett Co., corner of U and Seventeenth streets, N. W. Lester D. Moore, Jr., agent for the Premier and Reo in Washington, D. C., has removed from 814 Fourteenth street to larger quarters at 829 Fourteenth street.

Theobald Company Formed—The Theobald Motor Car Co. has secured the Philadelphia agency for the Acme car and has opened handsomely fitted up offices, showrooms and shops at 608-610 North Broad street. This company has just been formed, with H. P. Childs, president, B. Franklin Theobald, vice-president, and H. M. Blake, secretary-treasurer. Mr. Theobald will have active management of the agency. The Acme, by the way, was awarded the "consistency cup" in the recent founder's week race, for the most consistent running throughout the contest—this in addition to the cup for finishing second.

San Francisco Home of the Stromberg Carbureter

Development Briefs

SPLITDORF MODEL B MAGNETO

C. F. Splitdorf, New York city, is bringing out for 1909 a model B magneto suited for four and six-cylinder motors, which magneto is of the separate coil type, in that the magneto itself produces a low-tension current which is raised to a higher voltage by a coil carried on the dash or any other place. This magneto has the armature A of the shuttle type carrying a winding W, one end of which is grounded and the other is taken off through a spindle S extending through the armature shaft A1 and insulated therefrom by a bushing B. The other end of the armature shaft A2 takes the driving gear, the entire armature being carried on two races of ball-bearings. The primary current taken off through the spindle S is delivered through the make-and-break device, carried in the housing H, to the coil. This housing has three binding posts, one leading to the ground, which takes off internally upon the end of the armature spindle; another is connected to the anvil of the make-and-break and reaches to one of the primary windings of the coil; and the third is for an auxiliary ignition by battery and coil and is so connected that the make-and-break of the magneto may be used for the auxiliary circuit make-and-break, except that the current will flow in the opposite direction from that of the magneto current and thus prevent wear upon the platinum points of the make-and-break.

This completes the low-tension feature of the magneto. The distributing part is driven from the armature shaft through brass gears G and G1, of one-to-two size, the larger having a recess into which is bolted the grey fiber insulating disk F. A brass segment K fitted with a radial arm extending to the center is imbedded in the fiber disk F, this segment being the distributor of the high-tension current, the connection of which from the coil is through HT, which has connection with the disk K through a fiber brush. A vulcanite cover, or lid, V carries four carbon brushes, two of which, 1 and 2, are shown, which brushes are kept in contact with the fiber disk by spiral springs. On the exterior of the vulcanite cap V are cup-shaped terminals T, for receiving the high-tension wires from the plugs. The distributor shaft DS is carried on two races of ball-bearings. In this type of magneto are used three pairs of magnets M, which carry at their lower ends the usual pole pieces between which the armature A revolves. The coil furnished with this magneto has a two-point switch suited for magneto and battery circuit, or to cut out both of these and stop the motor.

BILLINGS & SPENCER WRENCH

The Billings & Spencer Co., Hartford, Conn., is marketing a new set of 15 degree angle double-end wrenches for motor car use. These wrenches, seven in number, from $\frac{7}{16}$ inch drilled opening to 1¼ inch openings, are put in duck or waterproof kit bags, and are furnished either semi-finished or with a full case hardened finish.

PERFECT DRAG BRAKE

E. S. Youse, Reading, Pa., manufactures a drop brake or drag used to prevent motor cars from backing down a hill when the regular brake fails to work. These brakes are made in two lengths, one for 28, 30 and 32-inch wheels, and the other for 34 and 36-inch wheels. They are made to fit any size and shape of axle housing, and are strapped to the axle at the required point, after which they are connected by wire cable and pulleys to the driver's seat, so that they can be quickly raised or lowered, as occasion demands.

CLEANOLA FOR CLEANING

The Cleanola Co., Pittsburg, Pa., manufactures a compound, styled Cleanola, which is used for cleaning, polishing, renewing and preserving varnished surfaces. The manufacture of the preparation is according to a formula known only to the makers, and is claimed to be free from acids, alkali or volatile oils. It can also be used for the leather on tops or the upholstering.

GLIDDEN'S NEW BUILDING

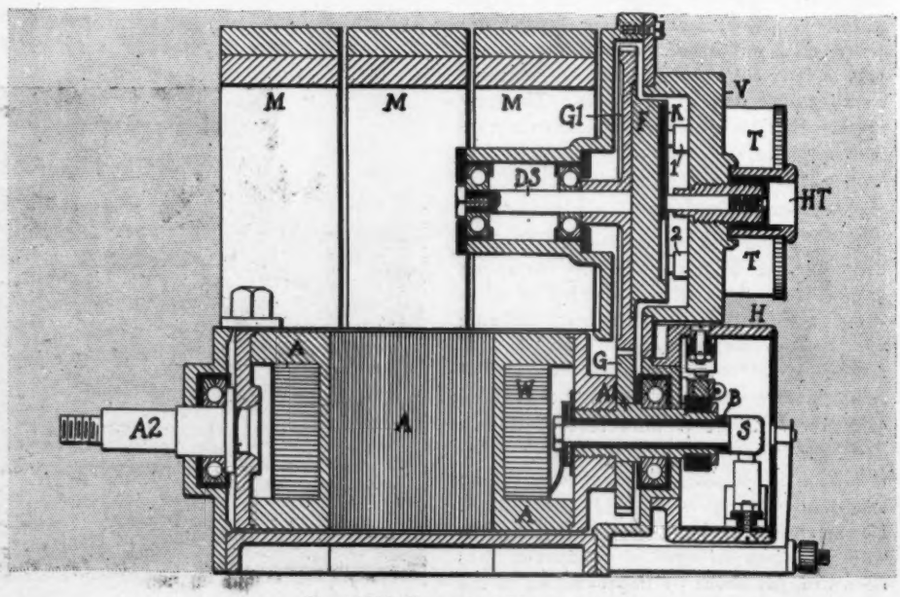
The Glidden Varnish Co., of Cleveland, has broken ground for its administration building. The building is to be of colonial architecture, of brick with white marble trimmings; 110 feet long by 65 feet deep, with elaborate columns across the front. It will be of concrete and steel construction and fireproof; two stories and basement. The first floor will be devoted entirely to the advertising, Jap-A-Lac and general sales departments of the company, telephone exchange and a dining-room where daily lunch will be served. The second floor will contain the officers' and board rooms, legal, credit, cost-accounting, purchasing and traffic departments. On the third floor will be a rest room, library and convention hall. Lavatories and shower baths for the use of the office force, which numbers about 100 people, will be in the basement. The building is to cost about $90,000 and will be ready for occupancy about May 1 next, when the general offices will be moved then.

OAKLAND FOUR-CYLINDER CAR

The Oakland Motor Car Co., Detroit, Mich., which, during the past year has been marketing two-cylinder cars with a vertical motor and balanced crankshaft system, has ready for next year a four-cylinder car with a 40-horsepower rating. It is expected that this car will incorporate in its make-up many of the interesting details of the two-cylinder which was designed by Alanson P. Brush, whose name is connected with one or two other cars at present on the market.

CLUTCH INSERT DATA

The National Brake and Clutch Co., Boston, Mass., manufacturer of cork inserts for clutches, brakes, etc., has prepared plans of three clutches for 20 to 24, 30 to 35, 45 to 50-horsepower machines. These plans indicate the angle and width of the cone face, the diameter of the cone, area of the cork surface, weight of spring required to give the best results, etc. The company is forwarding reduced sizes of these drawings to motor car manufacturers upon application.



THE 1909 SPLITDORF MAGNETO